Dissertation on

"A STUDY ON THE CLINICAL AND BIOCHEMICAL PROFILE OF PATIENTS ADMITTED IN TOXICOLOGY WARD WITH RODENTICIDE POISONING"

Submitted in partial fulfillment for the Degree of

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THE TAMIL NADU DR.MGR MEDICAL UNIVERSITY

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CERTIFICATE

This is to certify that the dissertation entitled "**A STUDY ON THE CLINICAL AND BIOCHEMICAL PROFILE OF PATIENTS ADMITTED IN TOXICOLOGY WARD WITH RODENTICIDE POISONING** " is a bonafide original work done by **Dr.SHOBANA.D,** in partial fulfillment of the requirements for M.D.GENERAL MEDICINE BRANCH-I examination of the Tamilnadu Dr.M.G.R Medical University to be held in April 2016, under my guidance and supervision in 2015

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DECLARATION

I hereby solemnly declare that the dissertation entitled **"A STUDY ON THE CLINICAL AND BIOCHEMICAL PROFILE OF PATIENTS ADMITTED IN TOXICOLOGY WARD WITH RODENTICIDE POISONING"** is done by me at Institute of Internal Medicine, Madras Medical College & Rajiv Gandhi Government General Hospital, Chennai during 2015 under the guidance and supervision of **Prof. Dr.G. SUNDARAMURTHY M.D.,** This dissertation is submitted to The Tamilnadu Dr. M.G.R Medical University, Chennai towards the partial fulfillment of requirement for the award of M.D.Degree in General Medicine (Branch I)

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CONTENT

INTRODUCTION

INTRODUCTION

In early times, poison was discovered by tribes as a hunting tool to catch their prey. Later poisons grew more advanced and were used for various purposes, usually weapons, anti-venoms and medicines. Recently it is used in the field of toxicology and for other technologies.

Though poison was used for constructive purposes, our mankind realized the danger of poison, when people misused it as a means for committing suicide. Even a small portion of consumption leads to loss of human life.

Rodenticides, which are easily available in households contribute a lot in consumption. It is highly dangerous and people are mostly not aware of its toxicity effect which result in high death rate.

This study shows the clinical and biochemical values of patients who consumed the Rodenticides. Usually Rodenticides are available in different forms such as past, powder, baits etc.

It is available in markets both as a local product as well as in branded product. Normally branded products has the chemical names and content printed on it whereas the local product does not show any chemical names on it.

Our study mainly conclude that the Rodenticides in paste form are more toxic. But the powdered and bait Rrodenticides also produces significant manifestation both clinically and bio chemically.

AIMS

AND

OBJECTIVES

AIMS AND OBJECTIVES

1) To study the clinical profile of patients with different Rodenticide compounds.
2) To study the biochemical profile of patients admitted in toxicology ward with Rodenticide poisoning.

REVIEW

OF

LITERATURE

REVIEW OF LITERATURE

Rotenticides, actually meant rat poison is manufactured mainly to kill rodents.

It is easily available in India due to its low cost and affordability.

Some Rodenticides are toxic, some are less toxic. It is available in many forms, each one of which carries significant role in killing the rodents and making clinical and biochemical variations.

After ingestion it is not only toxic to rodents but it is also toxic to humans and animals. Normally it is made in baits to attract animals. Baits are commonly used in the area containing ground meats, fruits and vegetables and also in the agricultural areas.[1]

Rodenticides are heterogeneous group of compounds that create high toxicities to human and animals and it is considered as a high toxic substance which are available in homes. In before the mid of 20^{th} century metals like are arsenium and thallium were mostly used agent to make these Rodenticides.

They are available in different forms such as powder, bait and paste. Each one of it carries different action based on the content and percentage of the ingredients. They are available in local form and branded forms.

AVAILABLE OF RODENTICIDE IN SHOPS IN LOCAL BRANDS

Classification of Rodenticides.

Rodenticides are classified based on its chemical group. Some Rodenticides acts as anticoagulant (warfar in) which stops the normal clotting mechanism. Recently rodents have now become resistant to warfarin baits. The new development of super warfarin have increased the risk to humans.[2,3]

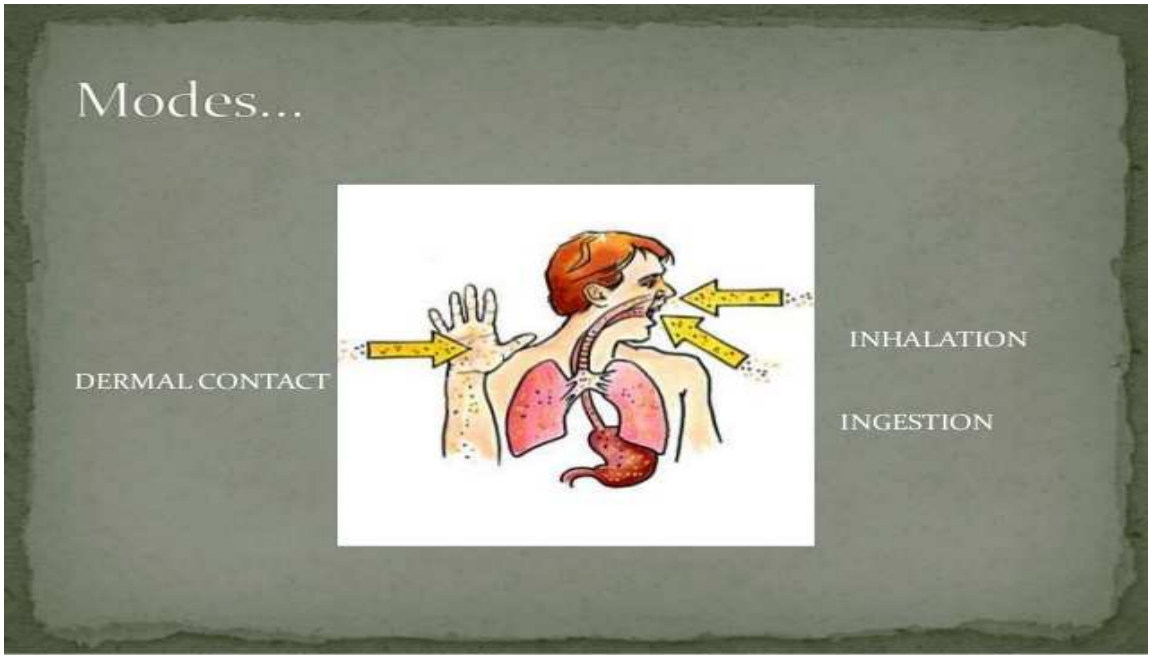
T6Table 1. ACUTE TOXICITY CLASSIFICATION – RODENTICIDES

	Oral	Inhalation	Dermal	Primary Eye Irritation	Primary Skin Irritation
Warfarin[3,6]	Moderate - High toxicity	Not significant	Not significant	No data	No data
Chlorphacinone[4]	High toxicity	High toxicity	High toxicity	Non-irritating	Non-irritating
Diphacinone[4]	High toxicity	High toxicity	High toxicity	Moderate irritation	Slight irritation
Bromadiolone[4]	High toxicity	High toxicity	High toxicity	Low irritation	Minimally irritating
Difethialone[3]	High toxicity	High toxicity	High toxicity	Mild irritant	Non-irritating
Brodifacoum[4]	High toxicity	High toxicity	High toxicity	Minor irritation	Mild irritant
Bromethalin[4]	High toxicity	High toxicity	Moderate toxicity	Slight irritation	Non-irritating
Cholecalciferol[3]	High toxicity	Very low toxicity	Low toxicity	No data	No data
Zinc phosphide[5]	High toxicity	High toxicity	Low toxicity	Slight irritation	Non-irritating
Strychnine[7]	High toxicity	High toxicity	Low toxicity	Highly irritating	Non-irritating

Classification categories were modeled after the U.S. Environmental Protection Agency, Office of Pesticide Programs, Label Review Manual, Chapter 7: Precautionary Labeling. http://www.epa.gov/oppfead1/labeling/lrm/chap-07.pdf

[table 1]organic and in organic form of rodenticide and shows the toxicity level and different mode of ingestion

Some of it changes the serum calcium level while some are toxic when inhaled. Rodenticides are toxic when eaten or inhaled or when it comes in direct contact within skin.[4,5,6,7]



picture[1]the poison is mostly intaken in three forms mainly by ingestion, inhalation and demal contact. Because of its different action the mode of treatment, complications and investigations varies.

Table 2. Summary of common rodenticides			
Rodenticide	**Type**	**Chemical Class**	**Days of feeding needed**
Warfarin	Anticoagulant	Hydroxycoumarin	Multiple
Chlorophacinone	Anticoagulant	Indandione	Multiple
Diphacinone	Anticoagulant	Indandione	Multiple
Bromadiolone	Anticoagulant	Hydroxycoumarin	Single
Difethialone	Anticoagulant	Hydroxycoumarin	Single
Brodifacoum	Anticoagulant	Hydroxycoumarin	Single
Bromethalin	Non-anticoagulant	Other	Single
Cholecalciferol	Non-anticoagulant	Vitamin D3	Multiple
Zinc phosphide	Non-anticoagulant	Other	Single
Strychnine	Non-anticoagulant	Other	Single

COUMARIANS AND INDANDIONES

ii) INORGANIC RODENTICIDES

a) Thallium sulphate

b) Yellow phosphorous

c) Zinc phosphide

d) Strychinne

e) Sodium fluoroacetate and fluoroacetamide

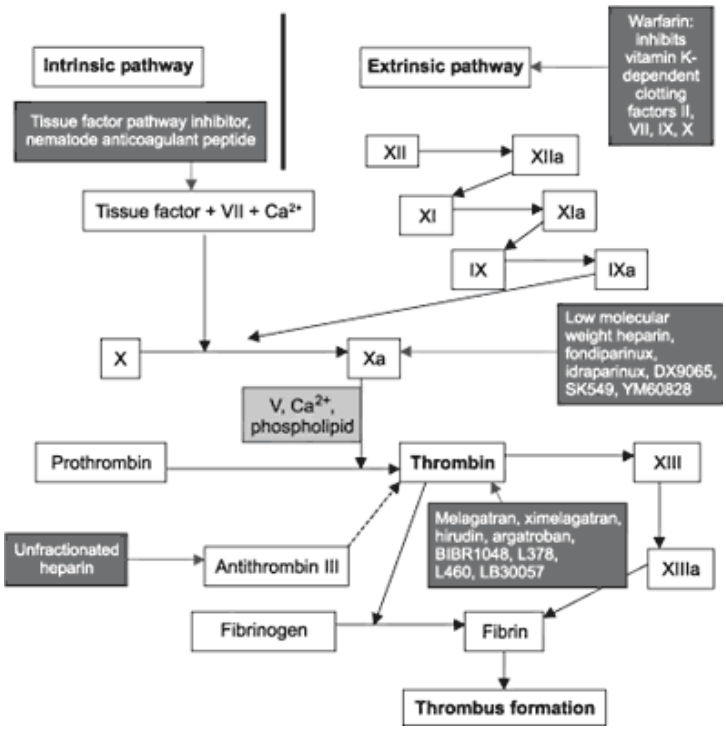
f) Aluminium phosphide.

Miscellaneous Rodenticides

Red Squill and Cholecalciferol

COUMARIANS AND INDANDIONES The most commonly used toxic Rodenticides are warfarin derivatives. The first Rodenticide action was anticoagulant by warfarin 1950 and it was registered to use.

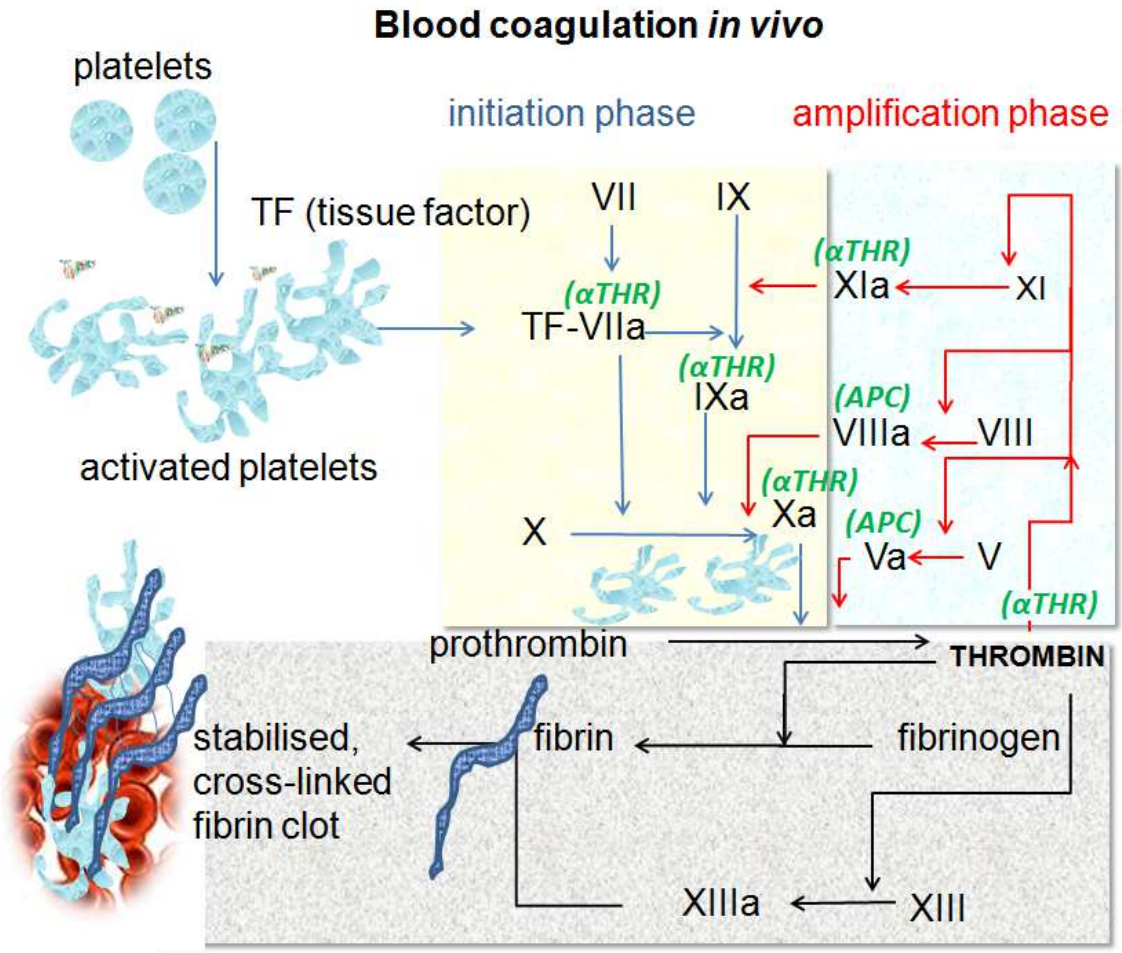
Warfarians are absorbed by the gastrointestinal track, and also across the skin. The normal cogulation path way are seen below:



This picture shows the normal clotting mechanism. The action of each factors both intrinsic and extrinsic pathway ,thrombus formation from thrombi

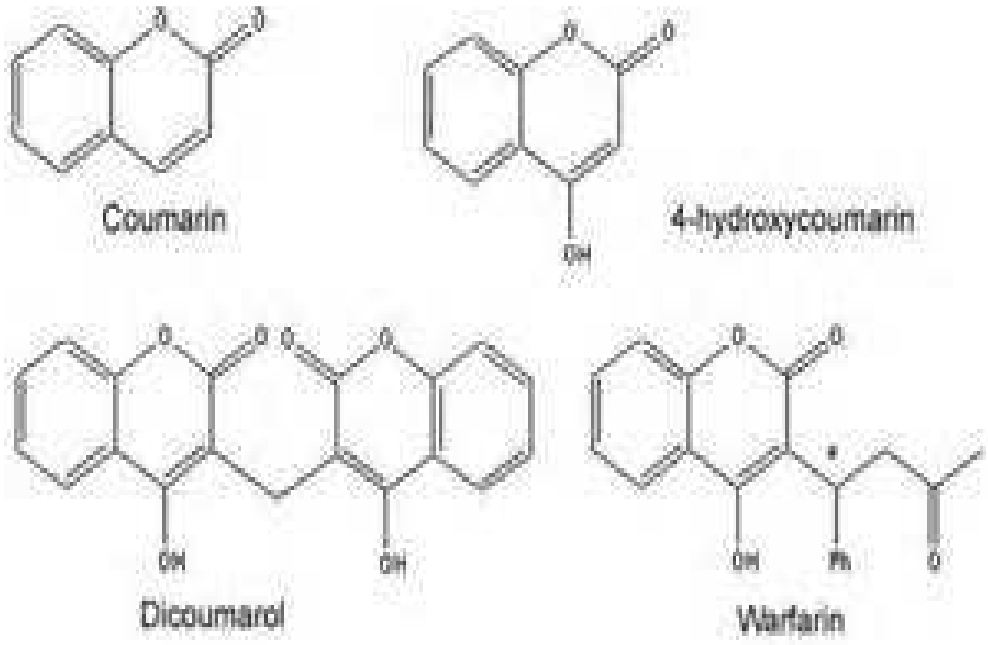
Mechanism of Action

Because of the coagulation, the normal haemostasis is maintained, platelets are accumulated and attached to the bleeding site



Injury to the endothelium cause factor VII activated, which activate X, then it activates prothrombin to thrombin, fibrinogen to firbin by thrombin. This fibrin stabilise the clot.

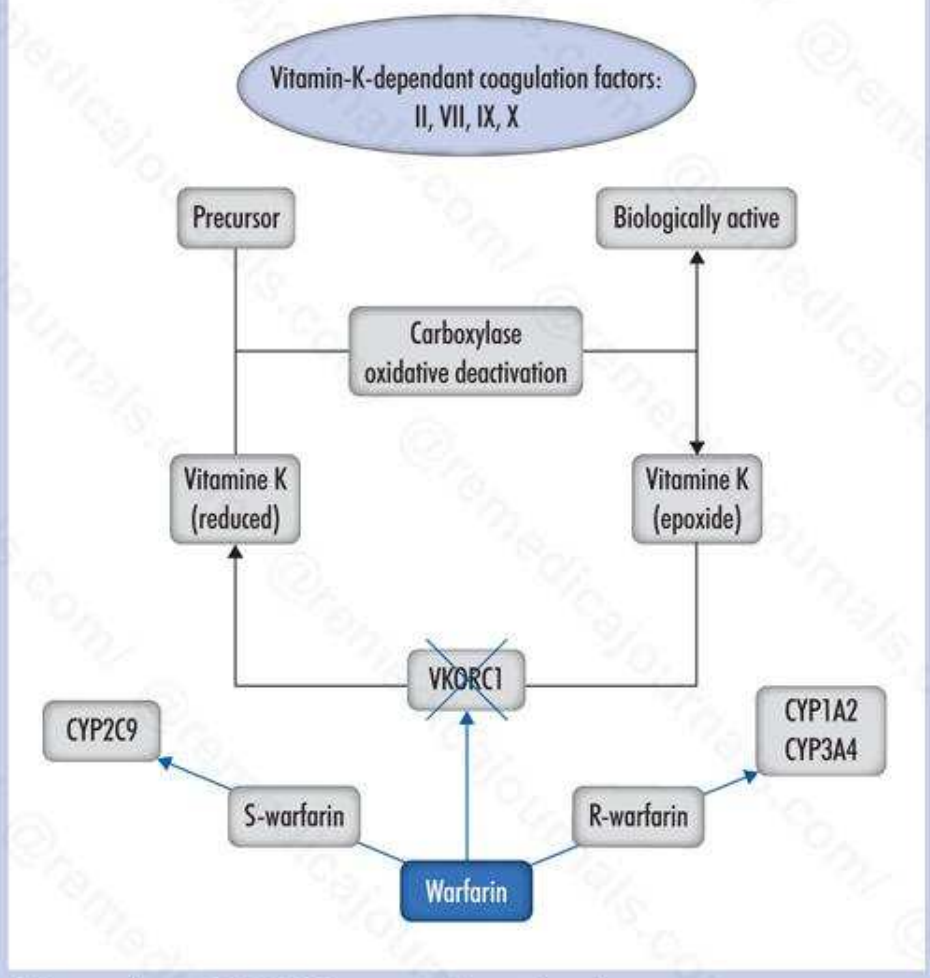
It suppresses the Vitamin K dependant clotting factor(II,VII, IX,X) in Liver. It increase the vascular permeability and causes internal haemorrhage. The effects can be seen few days later because of the long half-lives of the Vitamin K dependent clotting factor. Even small dosage can be more toxic.[2,3]



Molecular form of warfarin, coumarin

It prolongs the Prothrombin time. The duration takes within 24 hours to 36-72 hours.[8,9] Brodifacoum(super warfarin) can be more toxic, even if it is taken as low as 1 mg dosage in adults or 0.014 mg per kg in children.[2,3] Because of the long duration of the action of warfarin, Vitamin K has to be taken for a very long time with monitoring of the Prothrombin time.[10] A study shows that, warfarin toxic patient presented in unconscious state even after two weeks later due to the massive intra cerebral haemorrhage[11].

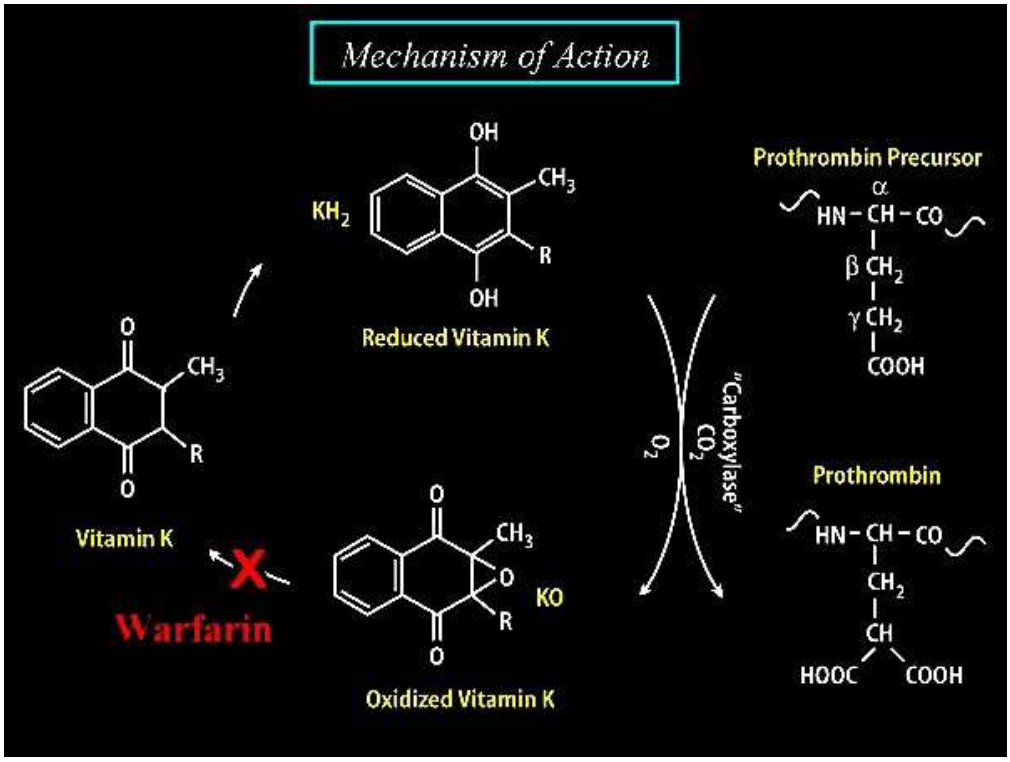
Figure 1. Mechanism of action and metabolism of the vitamin K antagonist warfarin.



CYP: cytochrome P; VKORC1: vitamin K epoxide reductase.

Image courtesy of Remedica Journals
http://www.remedicajournals.com/Advances-in-Venous-Arterial-Thrombosis/BrowseIssues/Volume-1-Issue-1/Article-The-Risk-of-Bleeding-with-Long-Term-Oral-Anticoagulation

ROLE OF VITAMIN K AGAINST WARFARIN



Vitamin K role in coagulation pathway. It act as a anticoagulant and warfarin block the clotting mechanism in blood...

It is available in both cake and powder form and the mechanism of action is same in both of the content.

Treatment : In managing the anticoagulant derivatives over dosage

Monitor : 1. Liver function test

2. Prothrombin time

3. International normalised ratio

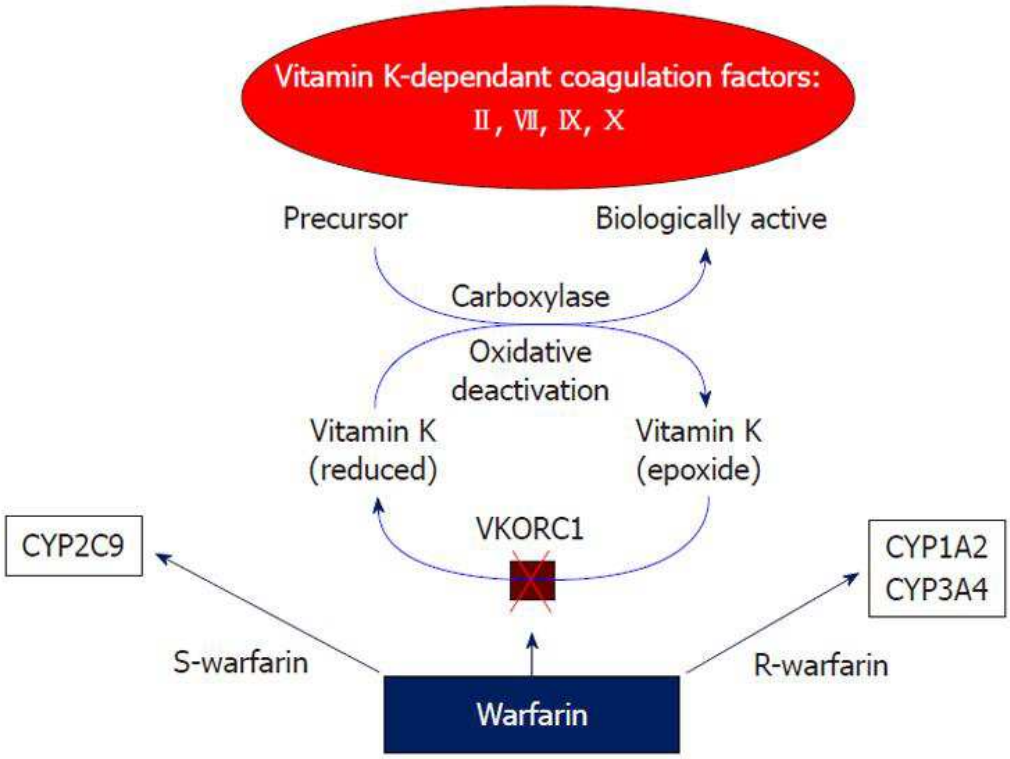
4. Complete blood count

5. Monitor vitamin K dependent clotting factors

vitamin K is treatment of choice based on prothrombin time for prolong bleeding, vitamin K can be given in infusion either with dextrose or normal saline

If the INR less than 2 it is unnecessary to start treatment.

1) **STOMACH WASH:** It will be useful within 60 minutes of the intake, after that there will be no role of action. The nasogasttric tube inserted in nose and stomach wash done by suction using water. All the content will be washed away after 60 minutes will be adsorbed [45]
2) **CONTRAINDICATIONS :** Risk of haemorrhage, corrosive poisoning, hydrocarbons
3) **CHARCOAL :** charcoal can be given along with stomach wash



ROLE OF WARFARIN TOXICITY IN BLOOD WARFARIN

INTERFERE WITH CLOTTING MECHANISM

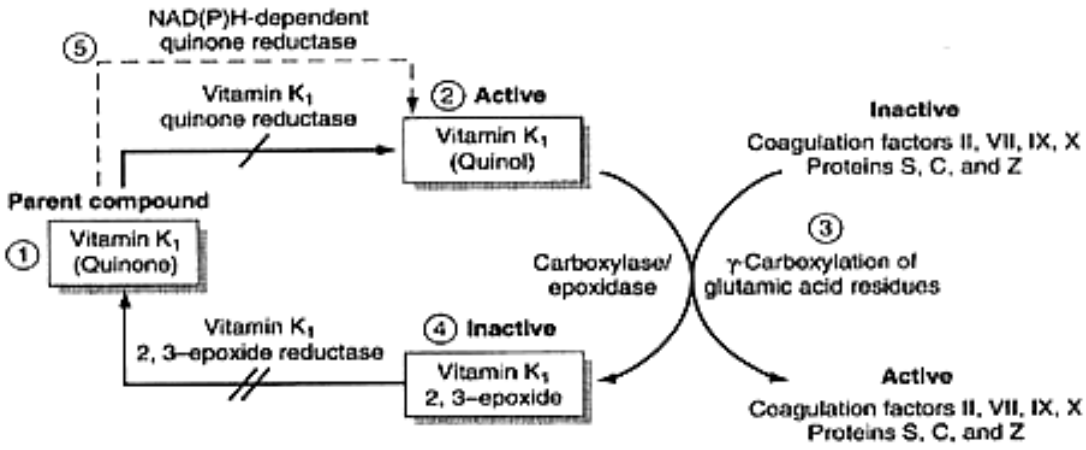
The initial presentation of warfarin toxicity within 24 hours have normal Prothrombin time. It takes to prolong after 48 hours [12] So monitoring is necessary for two to three weeks in certain cases.

Treatment:

Antidote

Phytonadione:

Neither Vitamin K3(menadione) or Vitamine K4(menadiol)



Dosage of phytonadione(oral)

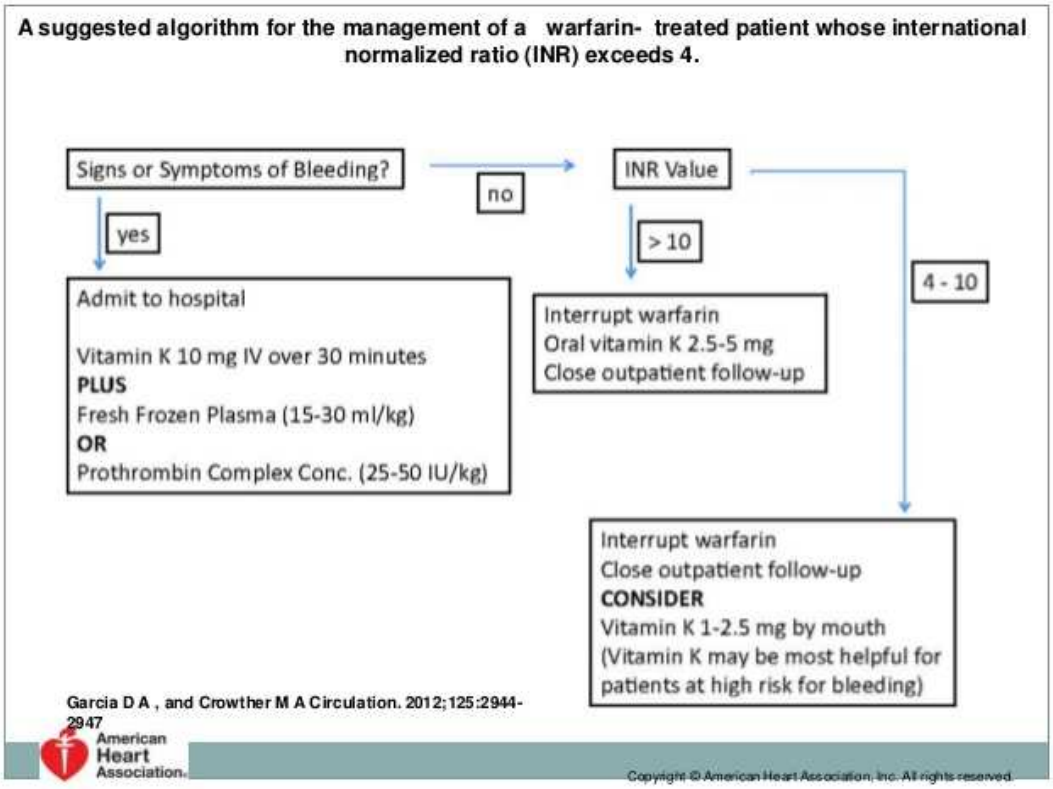
- Adults and children over 12 years: 15-25 mg
- Children under 12 years: 5-10 mg

Aquamephyton (colloidal phytonadione) (intra muscular)

Adults and children over 12 years : 5-10mg

Children under 12 years : 1-5 mg

The patients should be monitored for 5-10 days after ingestion.



Higher dose of anticoagulant can be treated with 100 mg for longer duration more than month.[44]

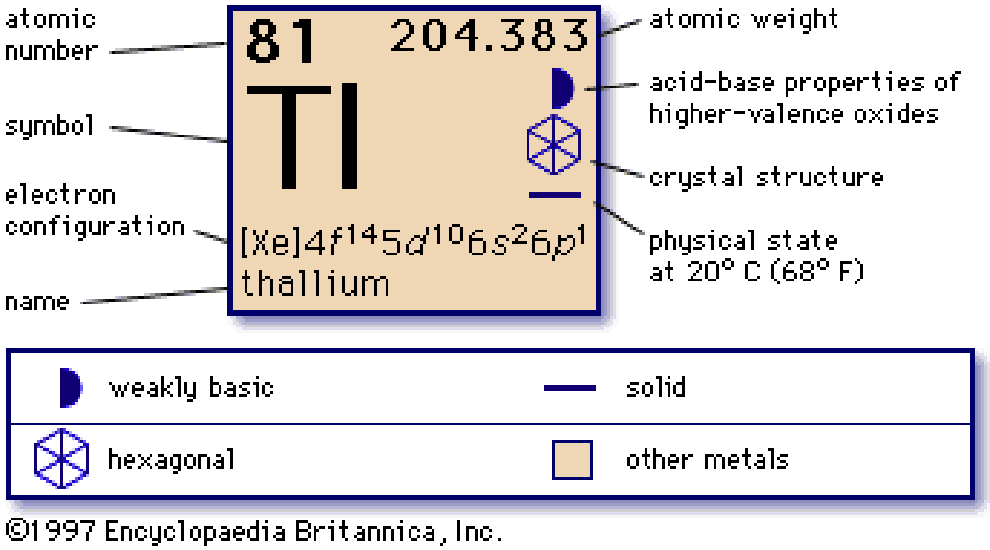
INORGANIC RODENTICIDES

a) Thalium

Thallium sulphate is mostly intaken by the guts and across the skin. These components are mostly excreted in the kidney and liver. The half-life of Thallium is 1.9 days in blood. In humans LD50 is between 10 and 15 mg per kg[13].

The clinical presentation takes 24 hours to 48 hours in high dosage and the neurological manifestation takes 2-5 days after ingestion. The main

cause of the death in thalium toxicity is by respiratory failure and cardiac arrest[14]



Mechanism of action of Thallium:

It causes ribosomal damage and riboflavin sequestration. It blocks the potassium dependent channel and interfere with myelin sheath

It damage the oxidative phosphorylation by attach to the sulphydryl group in mitochondria block the respiratory cycle.

Treatment:

Initial stomach wash should be given, then activated charcoal to absorb the content, ferrocyanide also tried.

PHOSPHORUS:

Phosphorus available in different forms yellow phosphorus, white phosphorus, combine with zinc, aluminium

YELLOW PHOSPHORUS

Phosphorous in various form-yellow, red, and violet it could not seen in earth because it is a free element

Phosphorous its autonomic number-15, is available in different forms.[32] Because of its organo phosphorous compounds it is used as Rodenticide. Inorganic phosphates come under non toxic group[33]

COMPLICATION IN GENERAL – PHOSSY JAW

Long duration of exposure to white phoshorous leads to tissue death around jaw. The complaints will be jaw swelling and tooth ache. Colour changes will happen[35,36]

White phosphorous consumption produce smoking stool syndrome. [34] For that toxicity before they used copper sulphate for it later found that the patient showed kidney and brain toxicity. Phosphorous combine with zinc ,aluminium and various molecules, each one of that caries specific role .

ALUMINIUM PHOSPHIDE:

It affects the cardiovascular system in the form of myocarditis and also affects other major organs [37].It is more toxic.

For treatment, magnesium sulphate is used.[38] Patients admitted within 4 hours gastric lavage can be tried, later potassium permanganate is used in the ratio of (1;10,000) .Finally will go for haemodialysis.

The presentation will be late onset so monitor up to or beyond 72 hours is indicated[42]

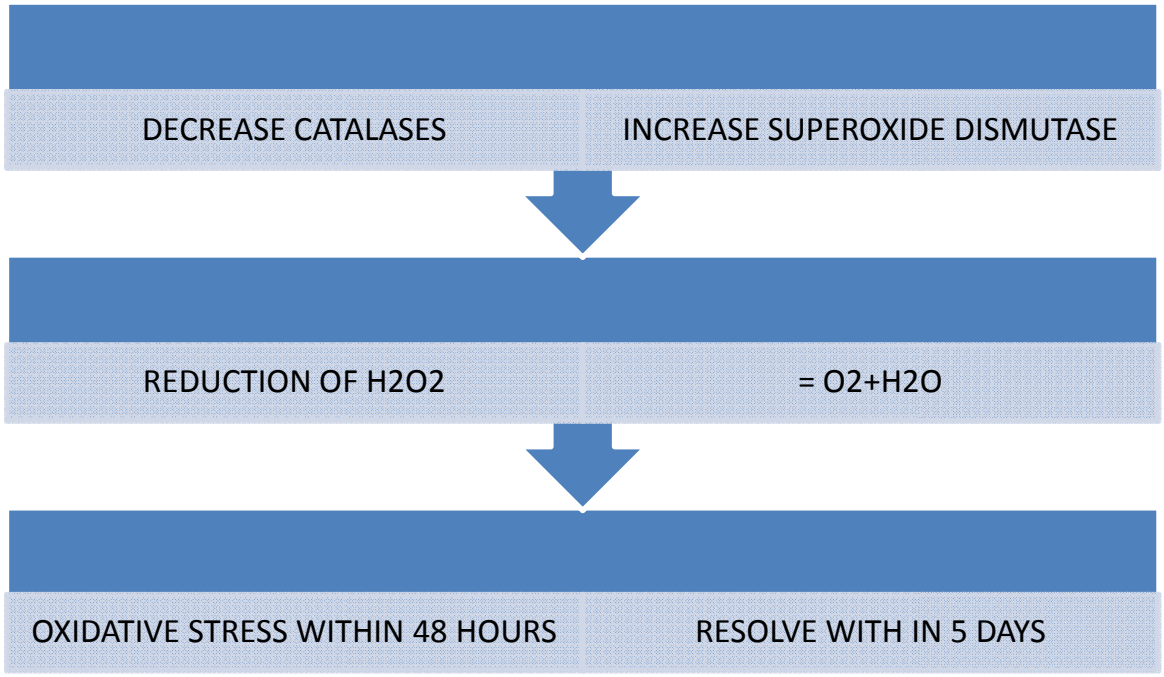
MECHANISM OF ACTION OF ALUMINIUM PHOSPHIDE

AIP+H2O=AL (OH) 3+PH3

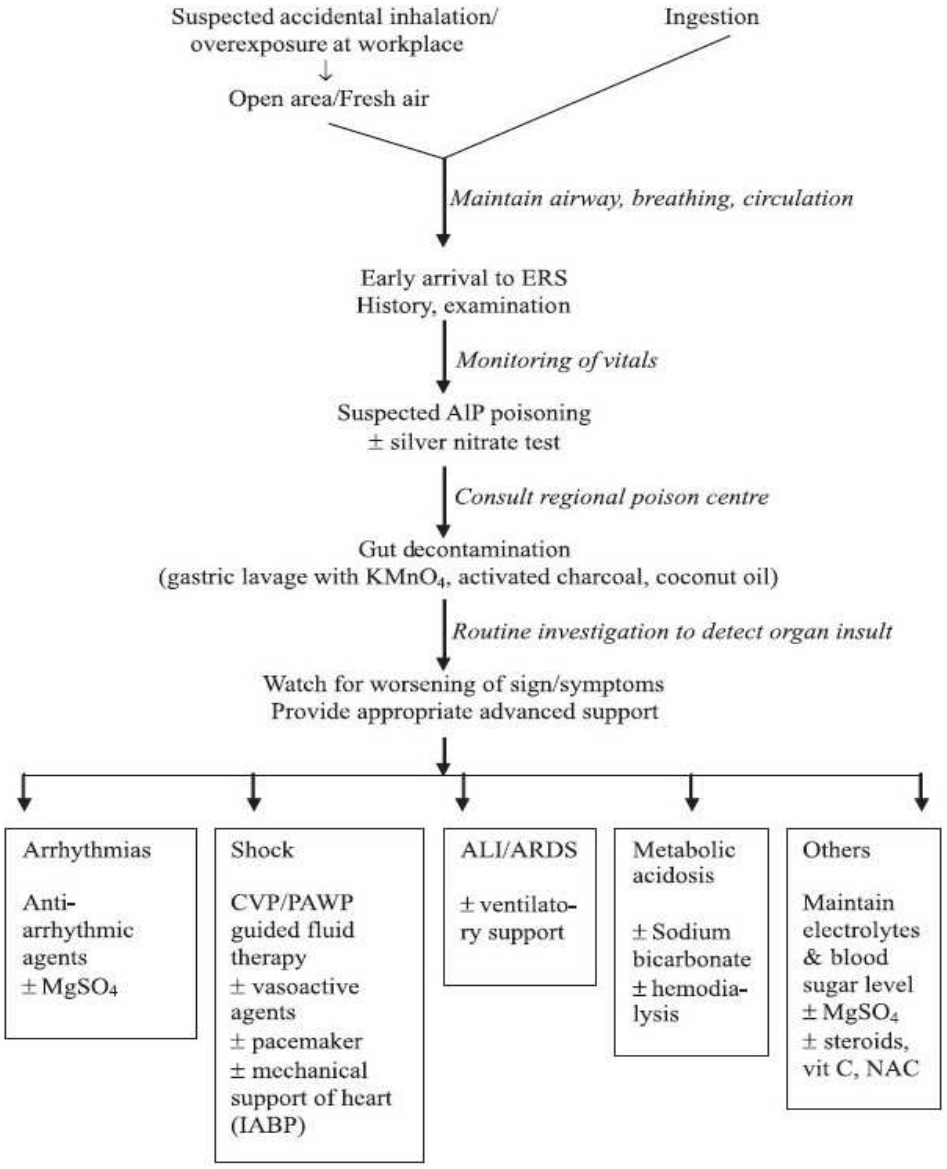
ALP+HCL=ALCL3+PH3

INHIBIT CYTOCHROME C IN MITOCHONDRIA

CELLULAR RESPIRATORY DAMAGE



TREATMENT OF ALUMINIUM PHOSPHIDE



Note: CVP = central venous pressure, PAWP = pulmonary artery wedge pressure, IABP = intra-aortic balloon pump, ECLS = extra corporeal life support, ALI/ARDS = acute lung injury/acute respiratory distress syndrome, NAC = n-acetylcysteine

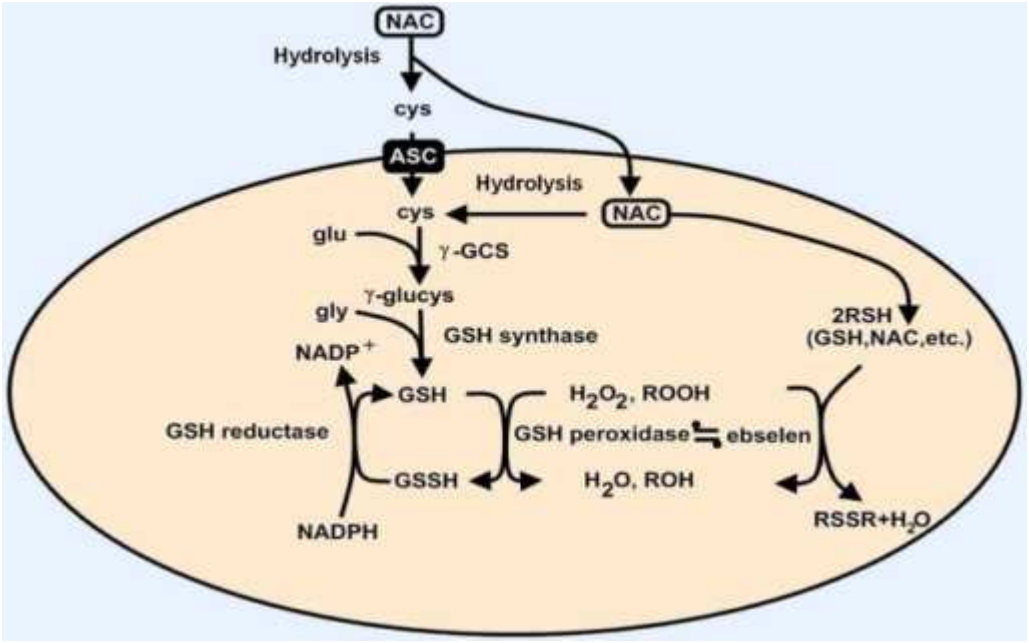
Studies shows that N-acetyl cysteine used as a antidote for rodenticide poisoning especially aluminium phosphide and zinc phosphide[47]

NAC helps to maintain the glutathione level for maintainance of micro circulation, and major role in inotropes. It interfere with inflammatory process [48,49]

It can be used in person who is not a candidate for liver transplant;

DOSAGE OF NAC:

150mg/kg for the first 60 minutes then the dose is reduced to 50mg/kg for four hours, then 100mg/kg for sixteen hours



ROLE OF NAC INCREASE THE GLUTATHIONE

YELLOW PHOSPHOROUS:

Yellow phosphorous is quite difficult to treat. It is also known as white phosphorous. It is more volatile and acts as a corrosive agent . It also causes damage to the skin and tissues. The first presentation of the toxicity is

Vomitting and severe throat with abdominal pain. It is available in powder, paste form.

PHOSPHOROUS IN PASTE AND POWDER FORM

They may also have blood vomiting.[15]

The more intake of the yellow phosphorous also causes a kind of garlic smell in patients [16,17]. It also affects various system of the body.

In end stage liver disease liver transplant is main stay of treatment the clinical presentation of it is divided in to :

Stage First : clinical presentation starts in a period of 24 hours-asymtomaticphase.

Stage Second: clinical manifestation will be occur between 24-48 hours- symptomatic phase

Stage Third : later 72 hours causes death [24]

CRITERIA FOR LIVER TRANSPLANT IN ACUTE LIVER FAILURE BY NON ACETAMINOPHEN TOXINS

INR >6.5(regardless of hepatic encephalopathy) OR 3 OUT OF 5

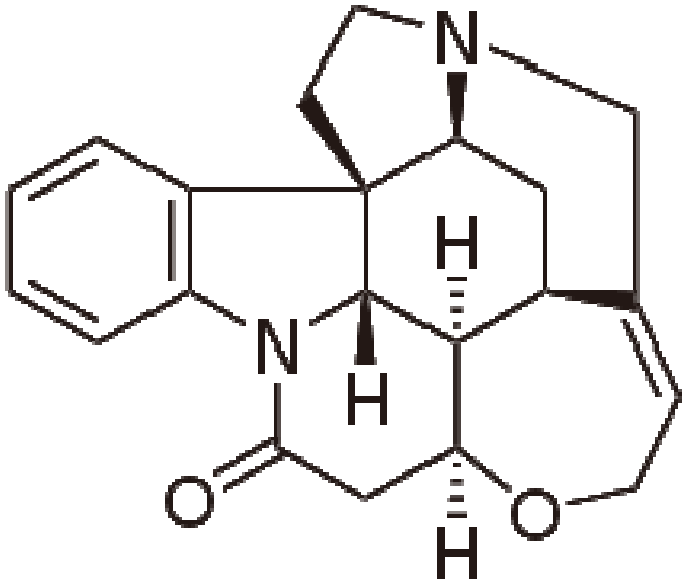
1. AGE <10 OR>40 YEARS
2. ETIOLOGY INDETEMINANTE DRUG INDUCED
3. TIME INTERVAL FROM CTERUS TO ENCEPHALOPATHY >7 DAYS
4. INR 3.5
5. BILLIRUBIN 17.6md/dl

ZINC PHOSPHIDE

It is less corrosive agent and less toxic than yellow phosphorous. The inhalation of the zinc phosphorous causes pulmonary edema. The main cause of death in Zinc phosphide is cardiomyopathy and shock due to the ventricular arrhythmias [16,18]

TOXICITY CLASSIFICATION - ZINC PHOSPHIDE/PHOSPHINE				
	High Toxicity	**Moderate Toxicity**	**Low Toxicity**	**Very Low Toxicity**
Acute Oral LD_{50}	**Up to and including 50 mg/kg (≤ 50 mg/kg)**	**Greater than 50 through 500 mg/kg (>50-500 mg/kg)**	Greater than 500 through 5000 mg/kg (>500-5000 mg/kg)	Greater than 5000 mg/kg (>5000 mg/kg)
Inhalation LC_{50}	**Up to and including 0.05 mg/L (≤0.05 mg/L)**	Greater than 0.05 through 0.5 mg/L (>0.05-0.5 mg/L)	Greater than 0.5 through 2.0 mg/L (>0.5-2.0 mg/L)	Greater than 2.0 mg/L (>2.0 mg/L)
Dermal LD_{50}	Up to and including 200 mg/kg (≤200 mg/kg)	Greater than 200 through 2000 mg/kg (>200-2000 mg/kg)	**Greater than 2000 through 5000 mg/kg (>2000-5000 mg/kg)**	Greater than 5000 mg/kg (>5000 mg/kg)
Primary Eye Irritation	Corrosive (irreversible destruction of ocular tissue) or corneal involvement or irritation persisting for more than 21 days	Corneal involvement or other eye irritation clearing in 8 - 21 days	Corneal involvement or other eye irritation clearing in 7 days or less	**Minimal effects clearing in less than 24 hours**
Primary Skin Irritation	Corrosive (tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (severe erythema or edema)	Moderate irritation at 72 hours (moderate erythema)	**Mild or slight irritation at 72 hours (no irritation or erythema)**

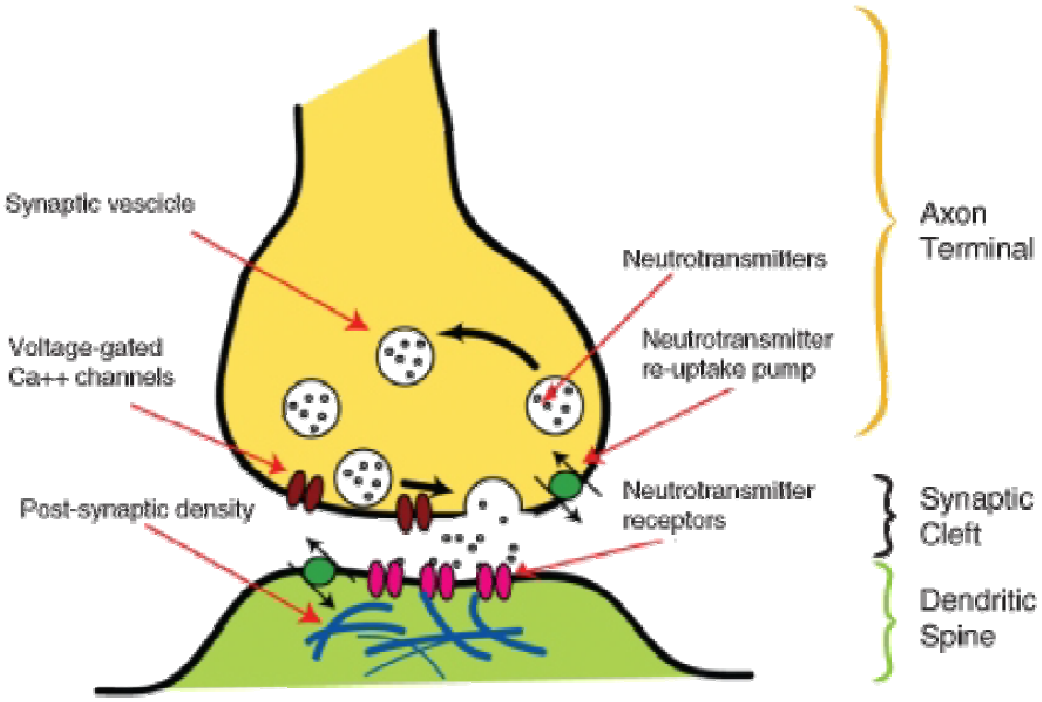
b) **stychinne**(nus vomica)



The main presentation of the poison is convulsion. The presentation takes within 15-20 minutes after ingestion. In humans, the half-life of the toxins is 10 hours. The toxic dosage is 15-100 mg. Even the low dose of 15mg may be toxic to children[19]

Mechanism of Action

In the spinal cord, the strychnine affects by firing the nerve cell which cause muscle spam. It also depends on the amount of dosage given.

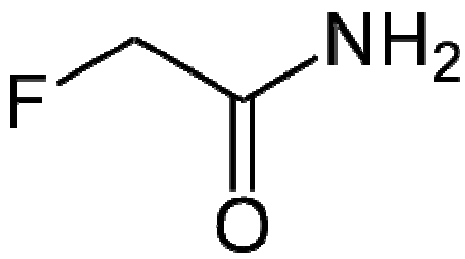


IT BLOCK THE POST SYNAPTIC NERVE TERMINAL, AND DECREASE THE NERVE CONDUCTION

TREATMENT:

1. **Activated choarcoal**
2. **Anticonvulsants(diazepam and phenobarbitol)**
3. **Muscle relaxants(dantrolene)**

SODIUM FLUOROACETATE AND FLUOROACETAMIDE



MOLECULAR FORM OF FLUROACETAMIDE.CHEMICAL FORMULA C2H4FNO IT BLOCK THE CITRIC ACID CYCLE

The main route of absorbtion is through the gut. It cause metabolic acidosis and electrolyte imbalance which are the poor prognostic factors.

The neurological manifestation of sodium fluoroacetate is tonic clonic convulsion and spasms[20]

Mechanism of actions

The molecule of fluoroacetate is converted to fluorocitrate in liver and it blocks the enzyme action in tricarboxylic acid (Krebs) cycle. It also interferes with the cellular respiration. The main organs involved are kidney, brain and heart.

TOXIC DOSE:

The mechanism of action starts after 2 to 20 hours the toxic dose of sodium fluroacetamide are 13 to 14 mg /kg. and the fluroacetate will be 3 to 7 mg/kg.

Symptomatic treatments

BARIUM:

BARIUM CARBONATE:

It is one of the rodenticide poisoning in practise. Its action upon muscle

It causes increase in intracellular potassium level and decrease the serum potassium level, it act as a depolarize action. The toxic dose will be 20 to 30 mg /kg .Its action will start after 2 to 8 hours

In north India it is used widely as rodenticide,[51] due to decrease extracellular potassium and turn off the sodium potassium ATPase meachanism[50].Normal serum blood level is 0.08 to 0.4mg/L.

TREATMENT”

1. Stomach wash

2. Potassium supplement

MISCELLANEOUS RODENTICIDES

Red Squill

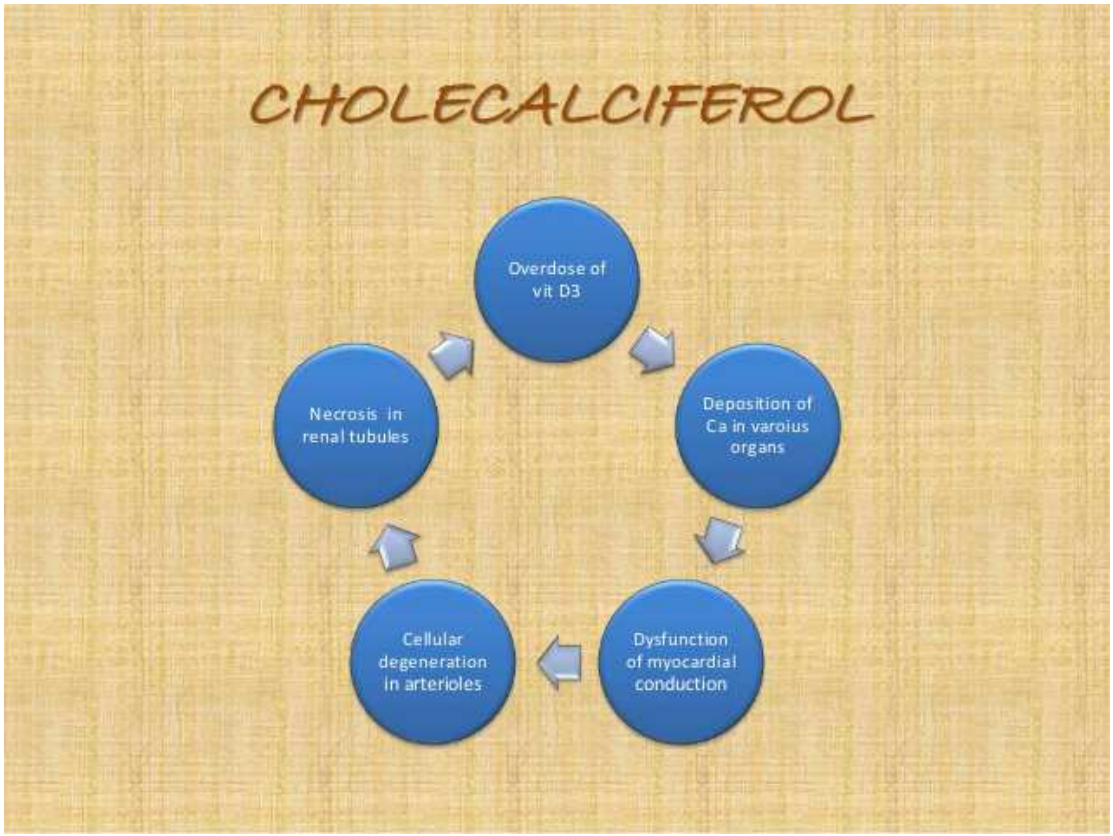
Red Squill is not a much used Rodenticide, as normally the mammals and other rodents will vomit immediately when intaken due to its intense nauseant property. So they do not retain the poison. The glycosides are also not absorbed by the guts efficiently, and even some of the absorbed glycosides are excreted quickly. Usually the glycosides causes cardiac impulse conduction and arrhythmias.

TREATMENT

Red squill does not affect much when given in low dosage. If it is taken more, syrup like ipecac is given, which initiates vomiting. We should also monitor cardiac status electrocardiographically.

CHOLECALCIFEROL

The toxic effect of Cholecalciferol shows actions on liver, kidney and myocardium. The toxicities increase the serum calcium level and it cause poly urea, polydipsia, proteinuria by tubular injury in kidney which is the main cause of death.



PICTURE SHOWS THE MEACHANISM OF VITAMIN D3 AND IT CAUSES RENAL DAMAGE

TREATMENT

The role of treatment is to decrease the intestinal absorbtion and increase the excretion, so that there will be a decreased level of calcium in the blood. Usually charcoal is given every fourth-hourly to increase the intestinal absorption.

Adequate hydration.

This is mainly done to increase the calcium level in urine. Monitoring of the electrolytes is necessary in the process.

Diuretic- It is given with the dose of 20-40 mg intravenously or 40-120 mg orally

Steroid-Oral glucocorticoids is given with a dose of 1mg per kg and maximum of 20 mg per day.

Calcitonin- It acts as a antidote and it is rarely used.[21] Dose of 4 international units per kg body weight every twelth-hourly in subcutaneous or intra muscular injection. It is continued for 2-5 days.

TREATMENT BASICS

Regularly we need to look for the container, and according to the product consumption we can start treatment. If the products not available we have to do symptomatic treatment.

1) In unstable patients we have to provide airway

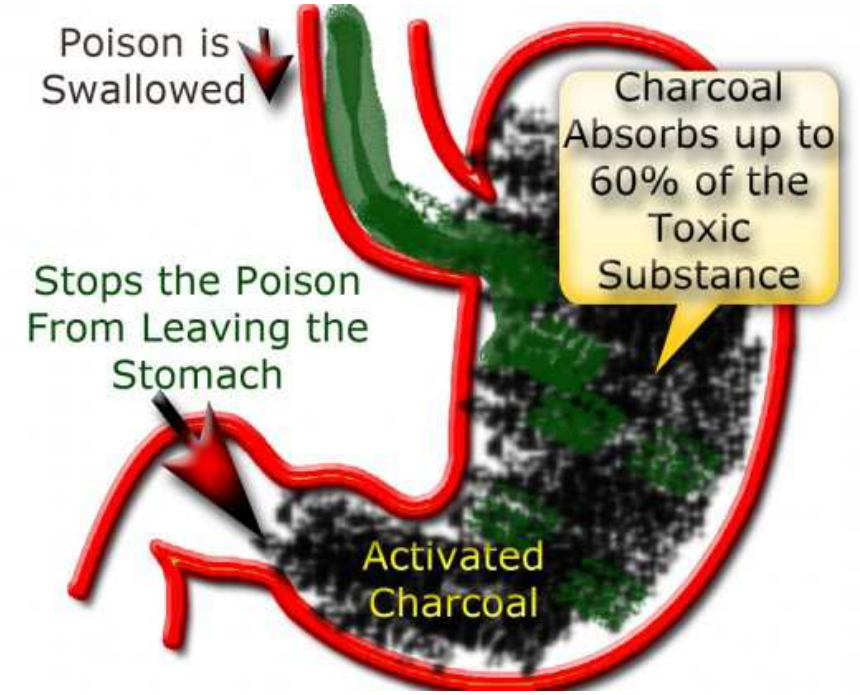
2) If BP is low, need to start ionotropes

3) Routine Investigations should be done to see the renal functions and liver functions

4) Coagulation profile should be done

5) All patients to avoid the intestine absorbtion, activated charcoal is given via nasogastric tube. It should start in 24 to 28 hours then only will be good result. To prevent the adverse reaction ,this procedure should be routinely done.

The dosage of charcoal taken 100 to 1000mg drug per gram. With water it is not diluted



6) Some time need we may need transfusion, in case of hemolysis poison like zinc phosphide which release phosphine gas.

7) Chelation therapy in heavy metal poisons. Examples Thallium and Arsenic.

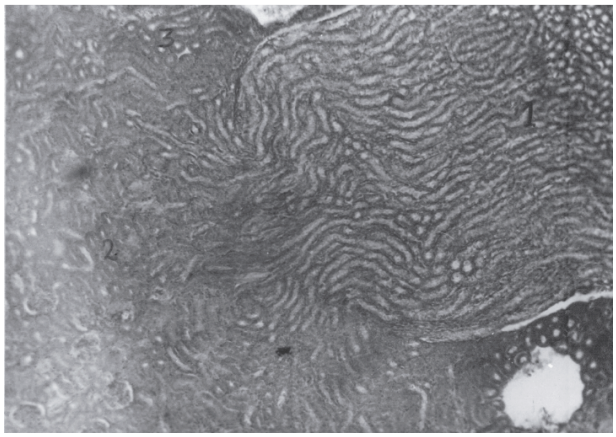
8) In case of renal toxic, hemodialysis should be done.

9) In patients with coagulopathy ,Vitamin K need to start with monitor PT/INR.

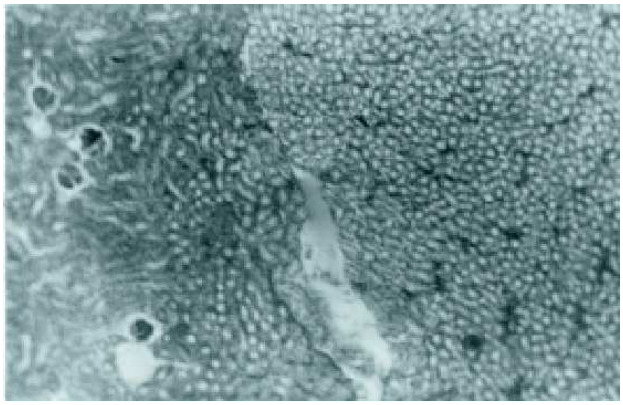
Clinical presentations and change in the Bio chemical parameters.

Renal Involvement

a) Bromadiolone: Study shows that even a single dose cause 100% mortality. After 6 hours of ingestion it causes increased concentration of toxic debris. After 12 hours, the toxic debris are deposited in the tubules. Afer 24 hours, this toxic debris destroy and cause necroses of tissues.[22]



NORMAL KIDNEY



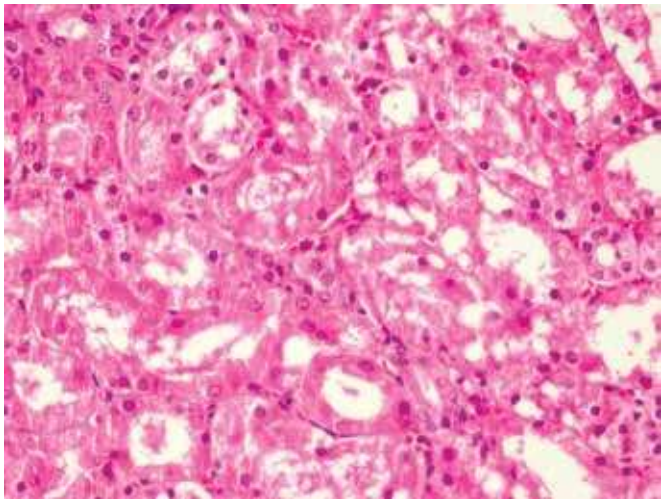
KIDNEY AFTER 6 HOURS OF INGESTION

KIDNEY AFTER 24 HOURS OF INGESTION

b) Thallium: It causes tubular damage, so monitoring of urine sediment and urine albumin to find out early damage of renal involvement

c) Cholecalciferol: Increases the protein , red cell and white cell in the urine

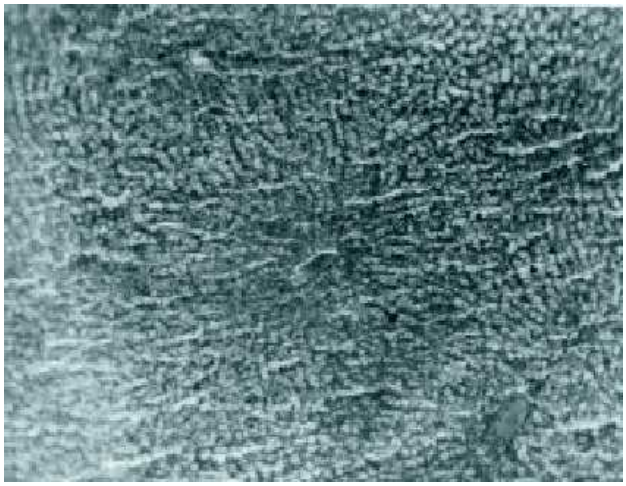
d) Yellow phosphorus: Most frequent presentation was decreased urine ouput because of the damage of renal tubules by deposition of toxic granules and bilirubin in tubules.



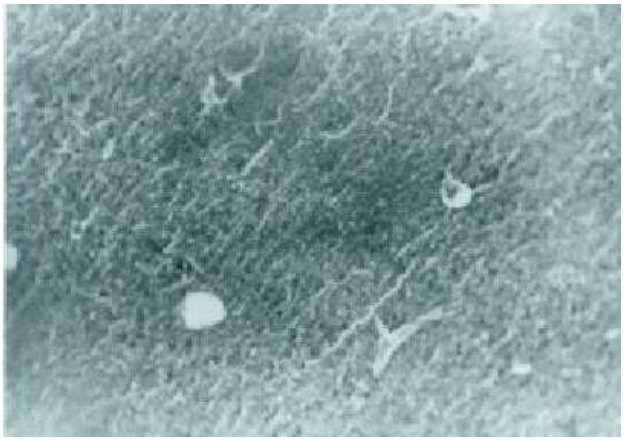
e) Vacuolar degeneration of kidney after yellow phosphorous intake.

Hepatic Involvement

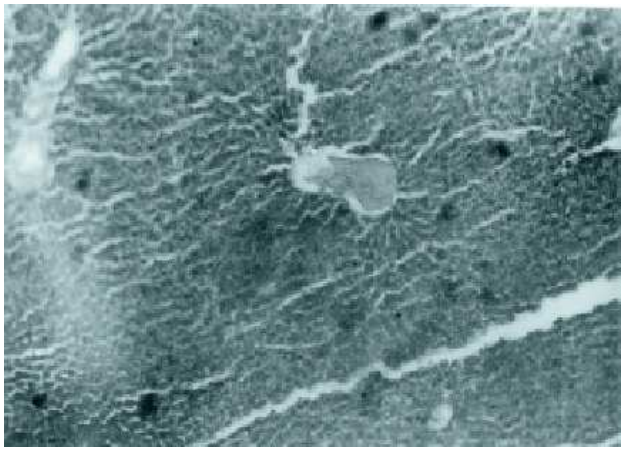
a) Bromadiolone: After 12 hours of ingestion, it cause feathery degeneration of the liver. After 6 hours it causes toxic debris to deposit and cell death. After 24-48 hours, it causes high damage to the liver cell.



NORMAL LIVER WITH NORMAL ARCHITECTURE



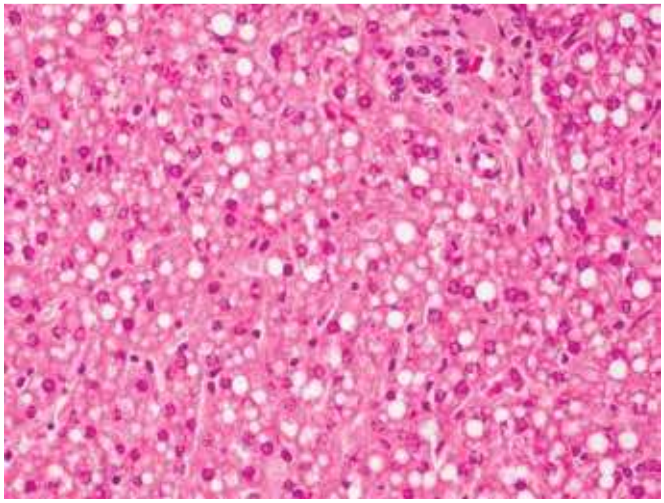
LIVER 6 HOURS AFTER INGESTION DESTRUCTION OF LIVER ARCHITECTURE



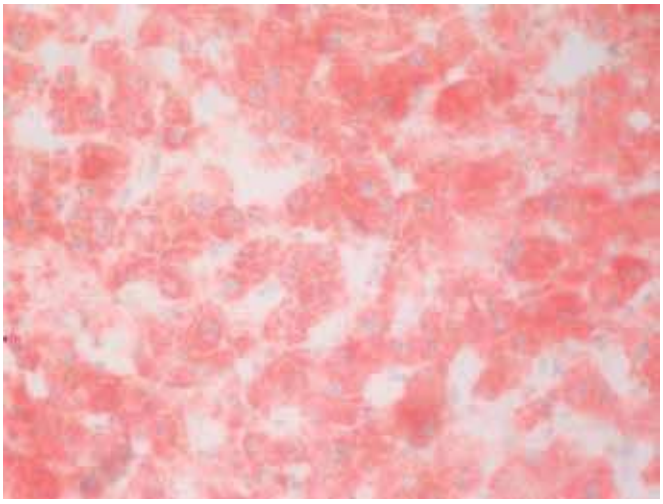
LIVER 48 HOURS AFTER INGESTION

b) Thallium: It mainly causes hepatic damage and elevated liver enzymes.

c) Yellow phosphorous: The presentation will be hepatomegaly and jaundice acute fulminant hepatitis, caogulopathy and hepatic encephalopathy. Liver biopsy shows steatohepatitis[30,31] and tissue necrosis.



THE APPEARANCE WILL BE VACUOLAR IN LIVER CELL AFTER YELLOW PHOSPHOROUS INGESTION. IT CAUSES PIECEMEAL NECROSIS



FAT GLOBULES DEPOSITED IN LIVER

d) Aluminiumphosphide: Higher dose affects the hepatic functions and jaundice will be presentations.

GASTROINTESTINAL TRACT:

a) Warfarin derivatives: Due to its prolongation of prothrombin time it causes hematemesis, malena, vomiting and abdominal pain.

b) Thallium: The main stay of presentation was nausea, vomiting and abdominal pain.

c) Bloody diarrhoea is also one of the presentation clinically in thallium toxic patients, stomatitis and salivation, the involvement of ileus in last stage .

CENTRAL NERVOUS SYSTEM

a) **Thallium**: Main clinical presentation is paresthesia , it may or may not be associated with gastrointestinal involvement.[23] Neurological involvement and its severity is accessed by involvement of myoclonic jerk, seizures, delirium and coma.

b) **Yellow phosphorous**: Irritation, lethargy and restlessness, hallucinations and psychosis are the first clinical presentation of phosphorous .and finally delirium ,coma and death.

c) **Sodium fluroacetate** and **Fluroacetamide**: Spasmodic convulsions may be due to electrolytes involvement, involuntary movements due to cerebellar dysfunction which finally leads to depression and coma. Also death occurs due to asphyxia.

d) **Strychnine**: Clinical presentation will be seizures due to its increase neuronal action.

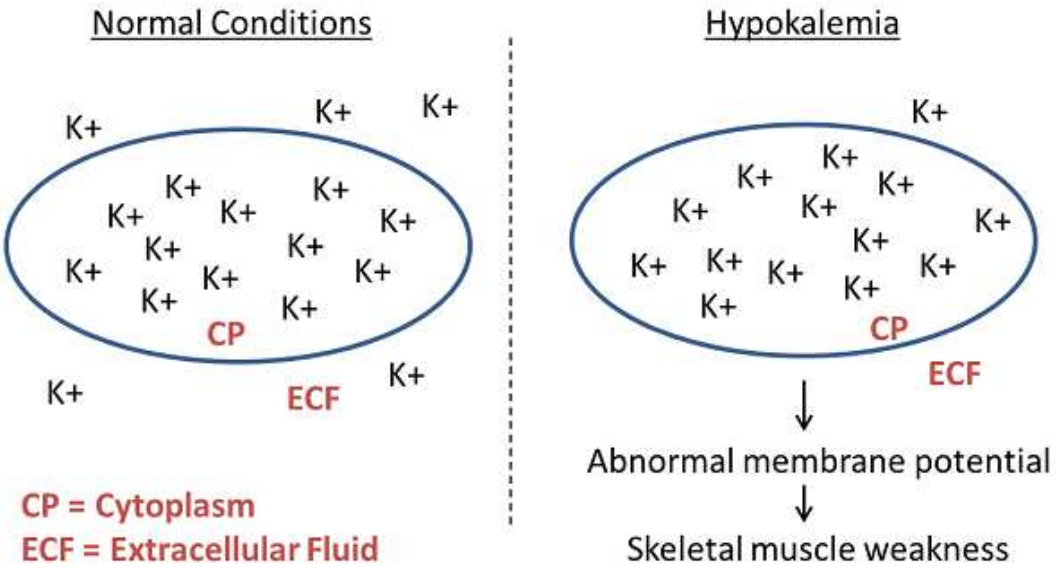
e) **Crimidine**: After thirty minutes of the intake, its clinical signs starts and the involvement will be involuntary movements ,convulsions, spasm of limbs.

f) Aluminium phosphide :

Neurological manifestations leads to altered sensations, involuntary movements, double vision. All these complaints progress to weakness of limbs, seizures episodes and coma.

g) Barium carbonate:

It cause acute quadriparesis and absence of reflex autonomic dysfunction, involuntary movements, trismus, myoclonus, headache, confusion , dilatation of pupil[53].



Left side picture shows that the normal potassium level in ECF, right side picture shows that low count of potassium produce abnormal depolarization.

HEAMATOLOGY:

a) Yellow phosphorus :Study shows that it can cause neuropenia and bonemarrow suppression leads to myeloid this complication occur in second stage[26,27]

CARDIOVASCULAR SYSTEM:

a) **Yellow phosphorous**: It causes tachycardia, arrhythmia, and hypotension which leads to toxic . Studies shows that the toxic manifestation leads to long term left ventricular dysfunction by decreasing the compliance of heart ,so monitoring ECG and Echo in high toxic patients.

Table 1: Laboratory investigations on admission

SGOT	1644 U/L	Platelet Count	81000/µL
SGPT	943 U/L	Creatinine	1.7 mg/dL
INR	6.08	Ammonia	109 µmol/L
aPTT	>100 sec	Total Bilirubin	4.21 mg/dL
GGT	198 U/L	Direct Bilirubin	3.70 mg/dL
LDH	2540 U/L	Alkaline phosphatase	658 U/L

Fig.1: Chest X-ray showing bilateral lung parenchymal involvement.

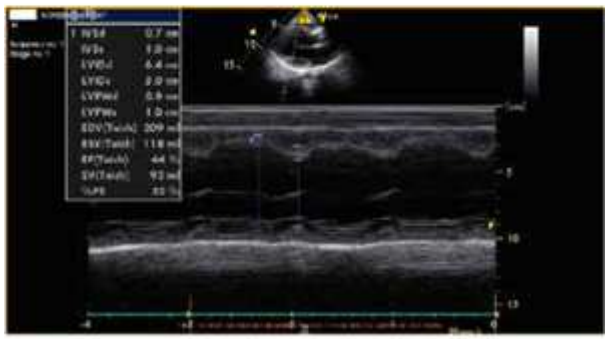
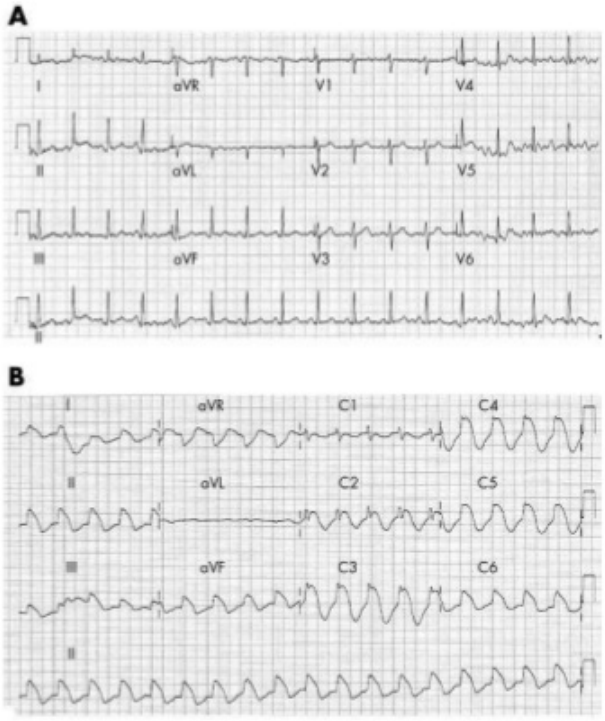


Fig.2: Echocardiogram suggestive of left ventricular dysfunction and dilatation of cardiac chambers.

b) **Thallium**: The first presentation will be hypotension ,arrhythmia and the late presentation will be hypertension due to its vasoconstriction action.

c) A**luminium Phosphide**: After intake of aluminium phosphide, it produce cardiac failure by damaging the myocytes which leads to cardiomyopathy[39], volume loss and play role on adrenal destruction[40].The symptom shows chest pain .

Patients highly need inotropic supports due to refractory hyotension. Brugada pattern in ECG due to electrolyte imbalance of pottasium [43]



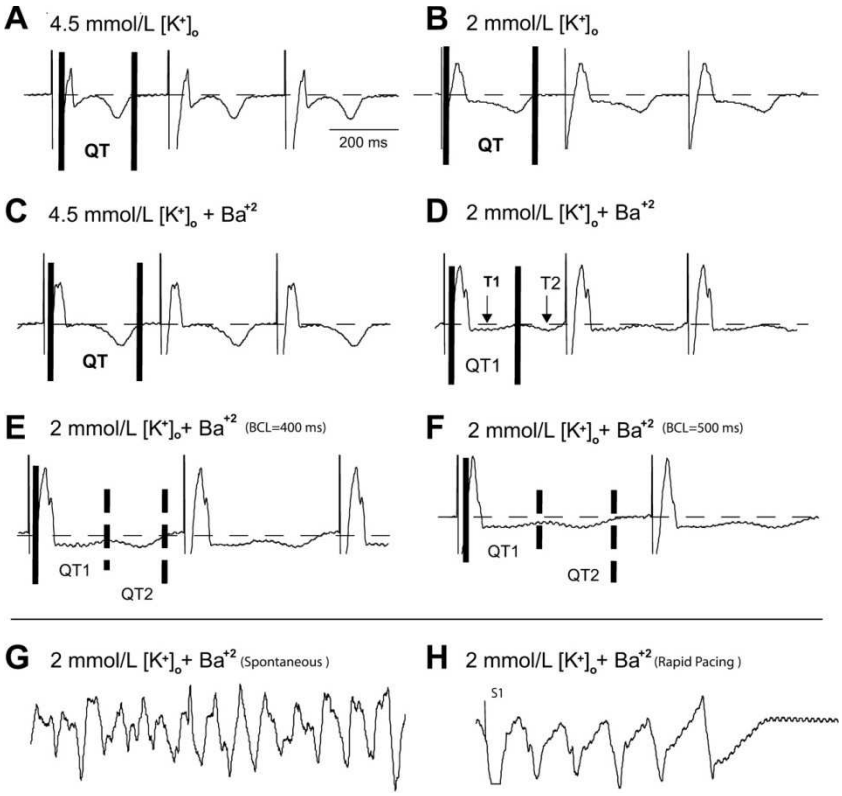
Electrocardiographic changes following aluminium phosphide poisoning. (A) 12-lead surface ECG recorded on admission showing sinus tachycardia. (B) ECG recorded 12 hours later showing extreme widening of the QRS complex

ECG SHOWS THE WIDE QRS AFTER THE POISON INTAKE,

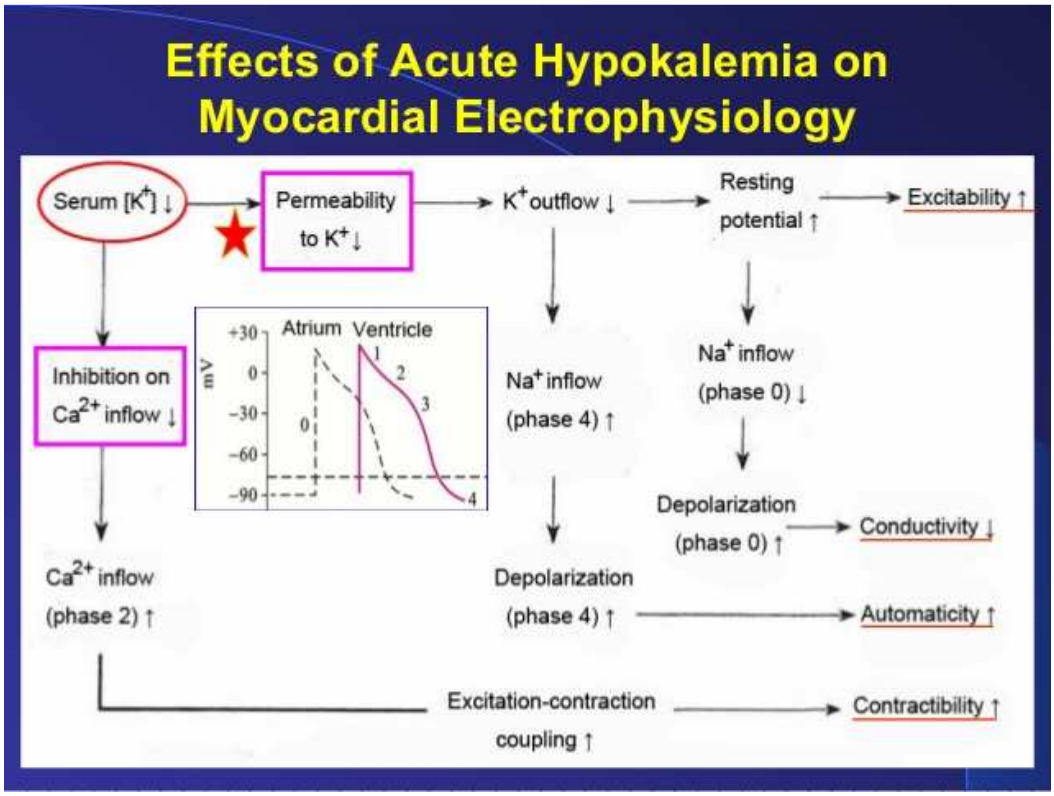
IT RECOVERS IN LATER STAGE

D.BARIUM CARBONATE:

It causes tachycardia, main role on rate activity finally leads to arrhythmia, in ECG ST changes occur, one of the clinical manifestation was hypertension.[52]



Mechanism of barium in depolarization and the mechanism of hypokalemia the value of potassium coming down with barium, and their recovery after 24 hours of treatment.



PICTURE SHOWS THAT DUE TO LOW K IN BLOOD,CAUSE ELECTROLYTES IMBALANCE AND CONTRACTION, EXCITABILITY

MATERIALS

AND

METHODS

MATERIALS AND METHODS

PLACE OF STUDY:

This study has been done at the toxicology ward of Madras Medical College, Rajiv Gandhi Govt. Hospital Chennai.

STUDY PERIOD:

6 months

STUDY DESIGN:

Observational Study

ETHICAL COMMITTEE APPROVAL:

For this study Approval has been obtained from the Ethical Committee.

INCLUSION CRITERIA:

All patients aged >= 13 years

EXCLUSION CRITERIA:

Patients with multiple compound ingestion.

Patient on antiplatelets or oral anti-coagulants.

Patients with previous major systemic illness.

CONSENT:

This study group thus identified by the above criteria(Inclusion and Exclusion criteria) was first explained and informed about the nature of the study. Those participants who accepted were taken up for this study with their written consent from the participants or their relatives in their respective languages.

STUDY SUBJECTS:

Those patients who fulfilled the inclusion criteria, which is above 13 years of age and both the genders have involved in this study. Those involved patients were completely examined, including their history and the necessary investigations were also taken.

The information, regarding the type and the amount of rodenticide consumed were taken from the patients and their relatives.

DEFINITIONS AND REFERENCE LAB VALUES USED IN THE STUDY:

HE(Hepatic Encephalopathy):

It is found in Patients with Chronic Liver disease. It is a reversible neurological disorder.

AKI(Acute Kidney Injury):

Increased Serum Urea and Creatinine Concentration, which often leads to decrease in Urine Output.

ARDS(Acute Respiratory Distress Syndrome):

Decrease in Oxygen Saturation and bilateral pulmonary infilteration, which 8presence of bilateral alveolar or interstitial infiltrates in Chest X-Ray and PCWP less than 18mmHg . No evidence of Left Atrial enlargement.

CBC(Complete Blood Count):

TC(Total Count):

Normal 4300-10,800 cells/cmm

HB(Haemoglobin) 13-18gm/dl(male), 12-16 gm/dl(female)

PLTS(Platelet Count) - 15,0000-40,0000/cmm

PT/INR(Prothrombin Time/ International Normalised Ratio)- 12-13 sec/0.8-1.2

BT/CT(Bleeding Time/Clotting Time) –Less than 9 minutes

RFT(Renal function Test):

Urea 20-40 mg/dl

Serum Creatinine 0.5-1.2 mg/dl(male), 0.4-1.1 md/dl(female)

Sodium 135-145 mEq/l

Potassium 3.5-5.1 mEq/l

Bicarbonate 22-28 mEq/l

Chloride 98-108 mEq/l

LFT(Liver function Test):

Serum Total Bilirubin -1.0 and 1.5 mg/dl

Serum Transaminase<30 U/L for men and <19 U/L for women.

CT(Computed Tomography)

OBSERVATION

AND

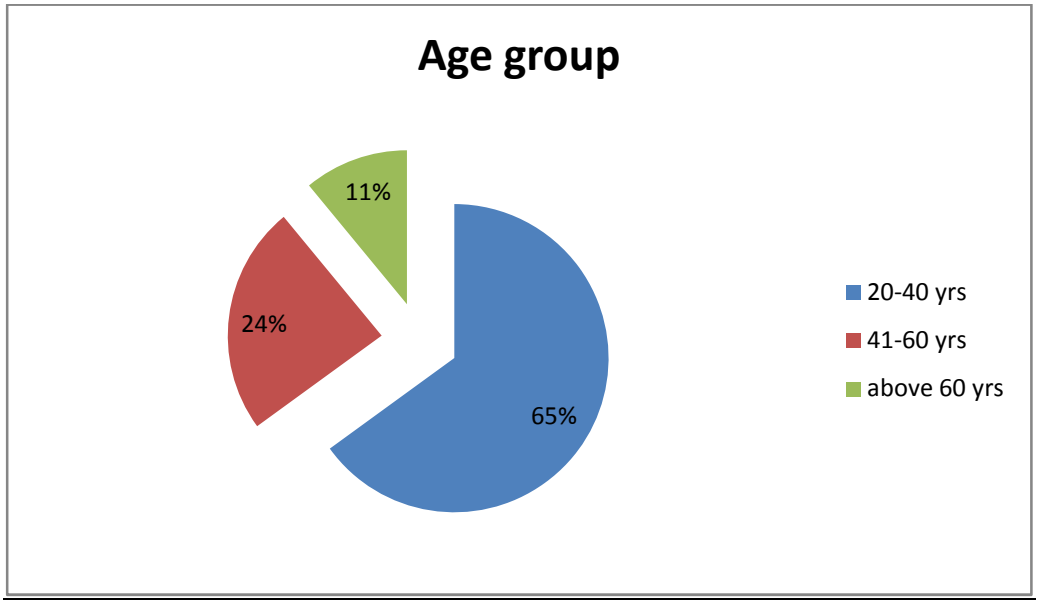
RESULTS

OBSERVATIONS AND RESULTS

1) Age : < 20& 20 to 40 & 40 to 60 & >60 - Results (20 to 40 Age Increased Number of patients)

age_group

		Frequency	Percent
Valid	20-40 yrs	98	65.3
	41-60 yrs	36	24.0
	above 61 yrs	16	10.7
	Total	150	100.0

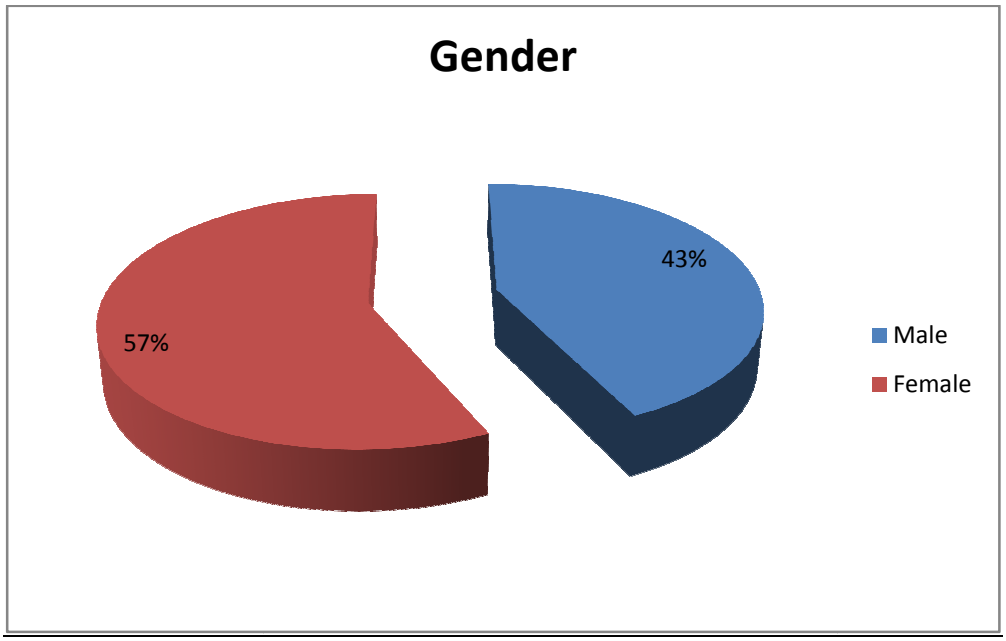


*Frequenty admit*ted patients in age between 20 – 20 years.98 patients are in this age group, it come around 65.3%.above 61 years 16 people are counted.36 patients from 41 to 60 years(24 %).

2) **sex : Female is more than male**

SEX

		Frequency	Percent
Valid	Male	65	43.3
	Female	85	56.7
	Total	150	100.0



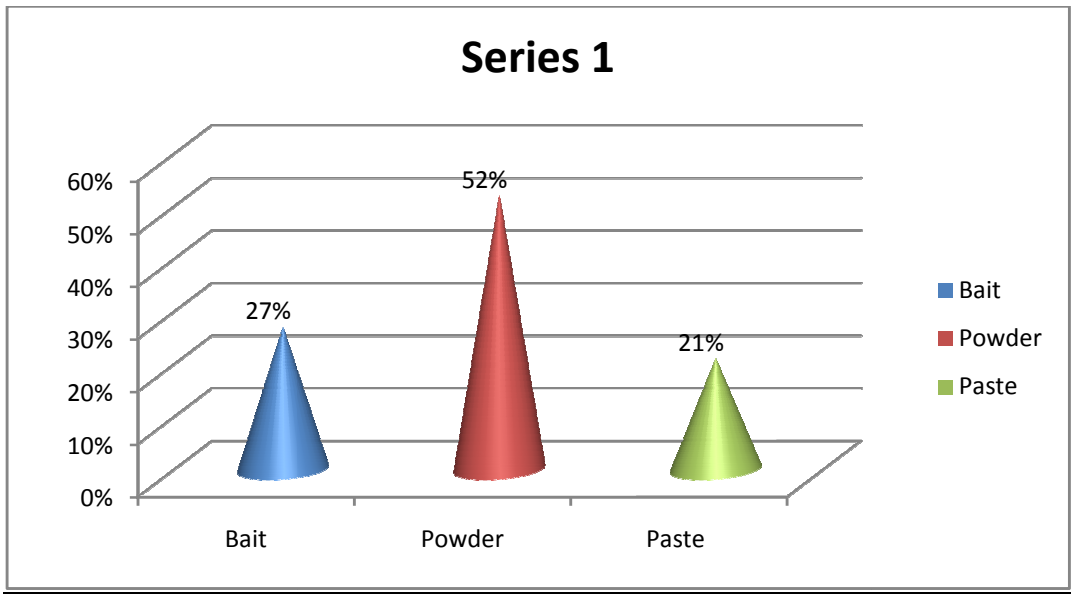
57% are female and 43.3% are male

In our study more number of female patients were involved, they come in higher percentage. Compared with female , male are lesser in number.

3) Content : powder > bait > paste

Content

		Frequency	Percent
Valid	Bait	40	26.7
	Powder	78	52.0
	Paste	32	21.3
	Total	150	100.0

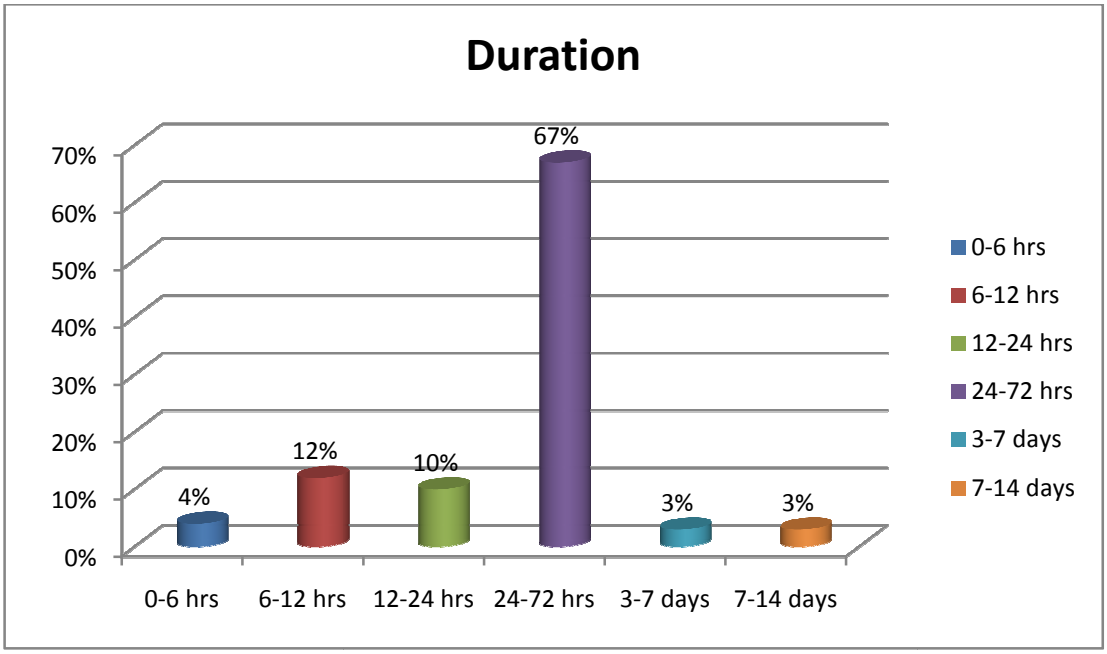


This picture shows the comparative chart as in which form of poison are more consumed. In this study shows that powder are more consumed by the people followed by bait then paste.52% are powder uptake,27% are bait uptake, 21% are bait

4) Duration : 0 to 6 HRS & 6 to 12 HRS & 24 to 72 HRS & 3 TO 7 DAYS & 7 TO 14 DAYS

DURATION

		Frequency	Percent
Valid	0-6 hrs	6	4.0
	6-12 hrs	18	12.0
	12-24 hrs	15	10.0
	24-72 hrs	101	67.3
	3-7 days	5	3.3
	7-14 days	5	3.3
	Total	150	100.0

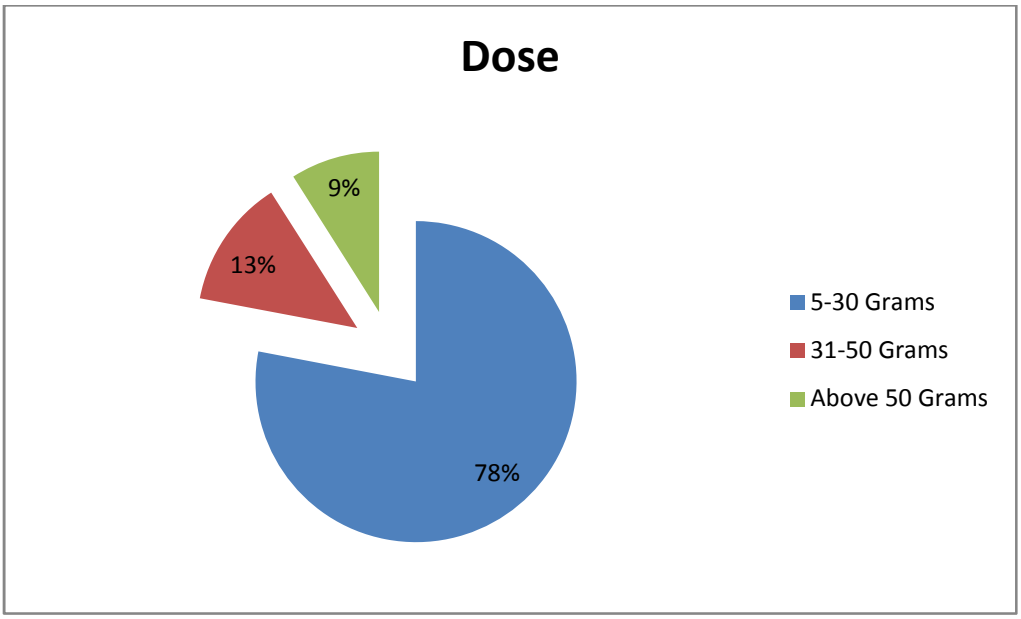


In our study more number patients reach the hospital for medical care in 24 hours 67% come under this group then 12% are from 6 -12 hours lesser number of patients in 0-6 hours and 3 -7 days

5) DOSE : 5 TO 30 G & 30 TO 50 G & > 50 G

DOSE_SCORE

		Frequency	Percent
Valid	5-30 Grams	117	78.0
	31-50 grams	20	13.3
	Above 50 grams	13	8.7
	Total	150	100.0

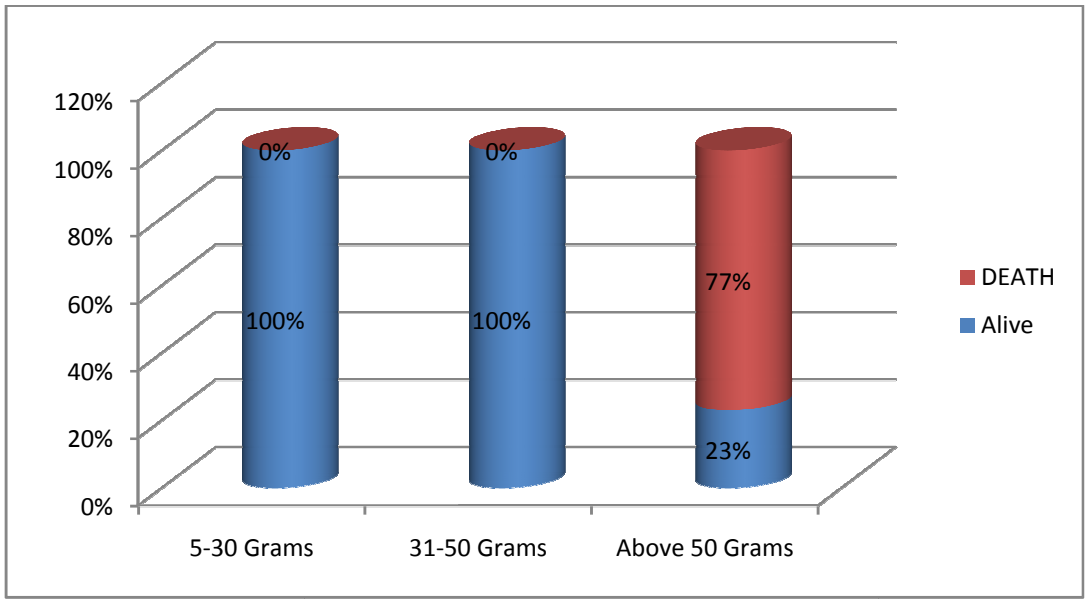


patients are classified according to their amount of consumption .78% uptake 5 to 30 grams,13%31-50 grams.9% are above 50 grams which produce more complications

DOSE_SCORE * DEATH CROSSTABULATION

			DEATH		Total
			Alive	DEATH	
dose_score	5-30 Grams	Count	117	0	117
		% within dose_score	100.0%	0.0%	100.0%
		% within DEATH	83.6%	0.0%	78.0%
	31-50 grams	Count	20	0	20
		% within dose_score	100.0%	0.0%	100.0%
		% within DEATH	14.3%	0.0%	13.3%
	Above 50 grams	Count	3	10	13
		% within dose_score	23.1%	76.9%	100.0%
		% within DEATH	2.1%	100.0%	8.7%
	Total	Count	140	10	150
		% within dose_score	93.3%	6.7%	100.0%
		% within DEATH	100.0%	100.0%	100.0%

Chi square = 112.912* p<0.001



Death related to amount of consumption of rodenticide poisoing

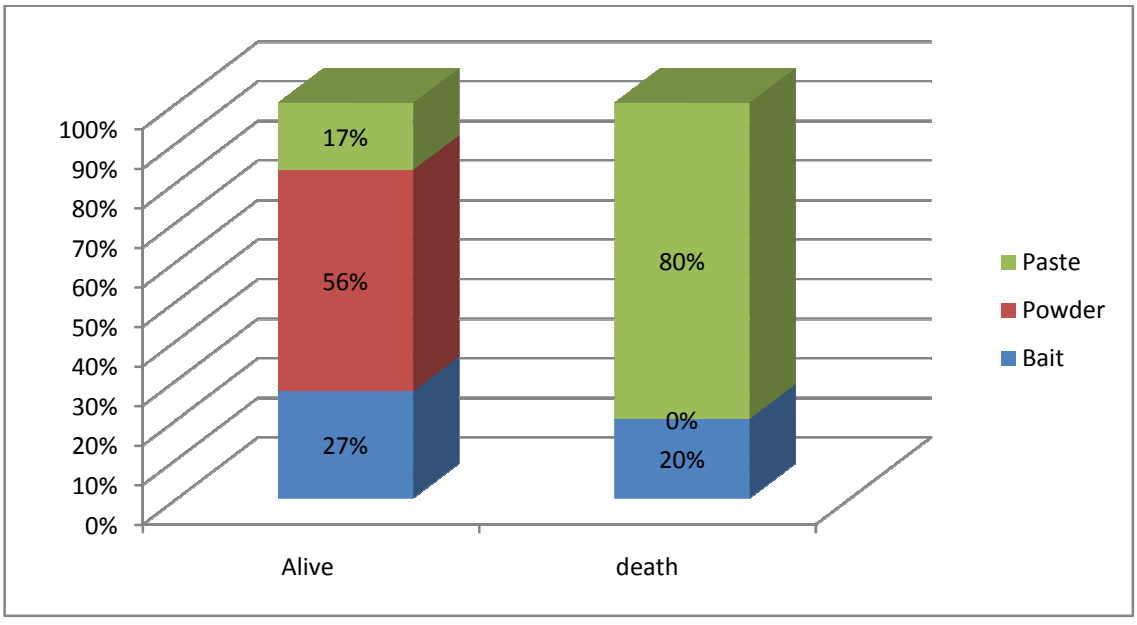
When intake of more than 50 grams 77% death rate.inkake of 5 grams not produce much complications

6) MORTALITY CHART : PASTE DEATH MORE IN PASTE FORM

CONTENT_ * DEATH CROSSTABULATION

			DEATH		Total
			Alive	death	
Content_	Bait	Count	38	2	40
		% within DEATH	27.1%	20.0%	26.7%
	Powder	Count	78	0	78
		% within DEATH	55.7%	0.0%	52.0%
	Paste	Count	24	8	32
		% within DEATH	17.1%	80.0%	21.3%
Total		Count	140	10	150
		% within DEATH	100.0%	100.0%	100.0%

Pearson Chi-Square 23.036* p<0.001

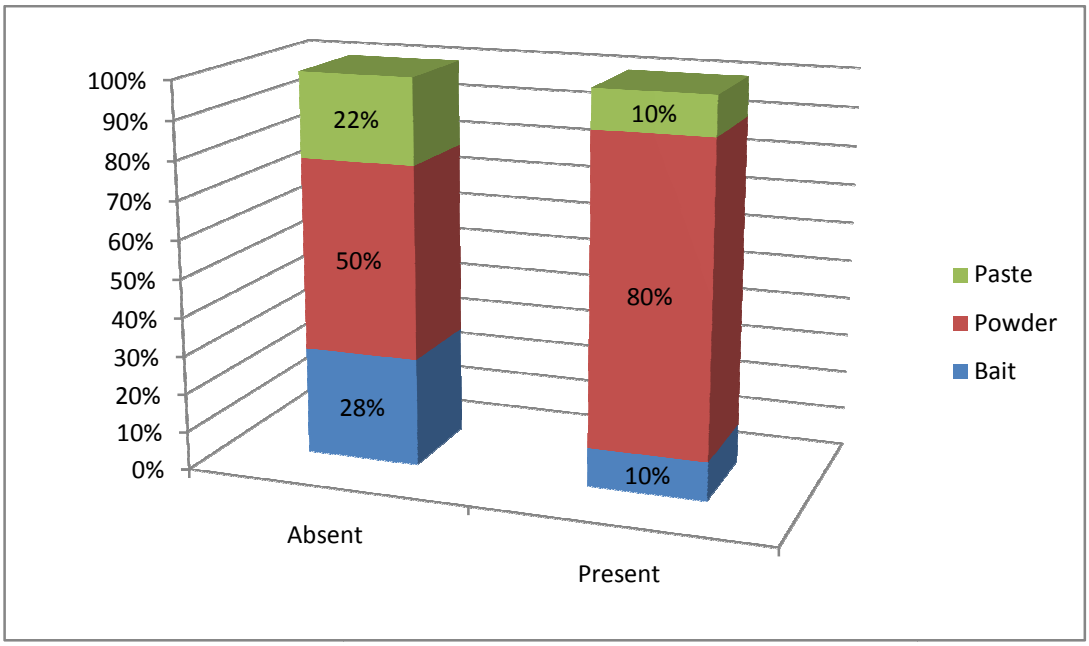


From this study, paste content produce more toxicity, 80% death from this substances and 20% from bait form.

ARRHYTHMIA IN_ECG * CONTENT_ CROSSTABULATION

			Content_			Total
			Bait	Powder	Bait	
ARRTHYMIA_IN_ECG	Absent	Count	39	70	31	140
		% within ARRHYTHMIA_IN_ECG	27.9%	50.0%	22.1%	100.0%
		% within Content_	97.5%	89.7%	96.9%	93.3%
	Present	Count	1	8	1	10
		% within ARRHYTHMIA_IN_ECG	10.0%	80.0%	10.0%	100.0%
		% within Content_	2.5%	10.3%	3.1%	6.7%
Total		Count	40	78	32	150
		% within ARRHYTHMIA_IN_ECG	26.7%	52.0%	21.3%	100.0%
		% within Content_	100.0%	100.0%	100.0%	100.0%

Chi square = 3.377 p>0.05 (0.185) NS



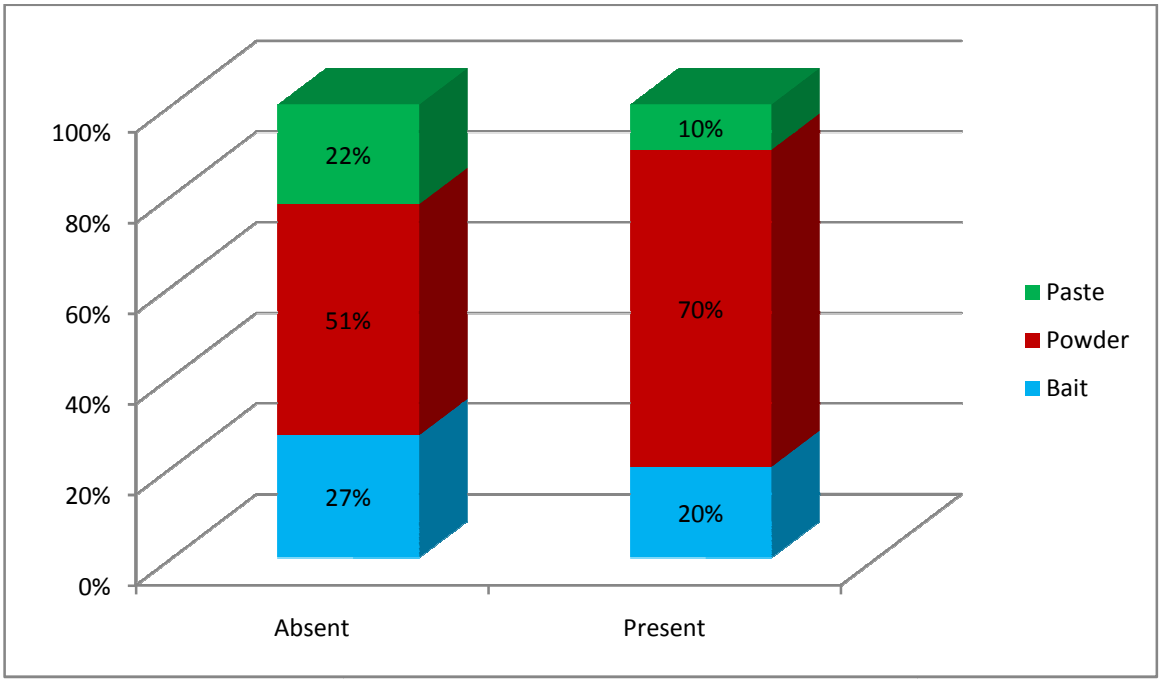
From 10 patients 80% are presented with arrhythmia in ECG and all those patients came with powder intake whereas 10% from bait and paste

Content_ * FEVER_

CROSSTAB

			FEVER_		Total
			Absent	Present	
Content_	Bait	Count	38	2	40
		% within FEVER_	27.1%	20.0%	26.7%
	Powder	Count	71	7	78
		% within FEVER_	50.7%	70.0%	52.0%
	Paste	Count	31	1	32
		% within FEVER_	22.1%	10.0%	21.3%
Total		Count	140	10	150
		% within FEVER_	100.0%	100.0%	100.0%

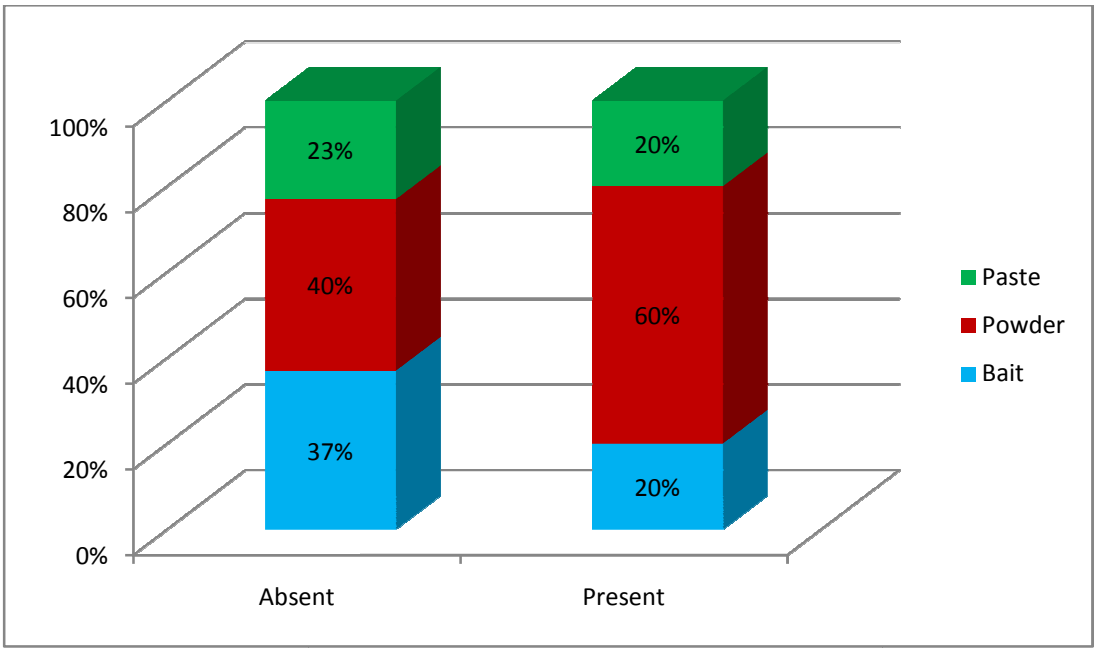
Pearson Chi-Square= 1.491 p=.474 NS



Fever- 20% from bait intake ,70% from powder intake and 10% from paste substance.

VOMITING - CROSSTAB

			VOMITING_		Total
			Absent	Present	
Content_	Bait	Count	22	18	40
		% within VOMITING_	36.7%	20.0%	26.7%
	Powder	Count	24	54	78
		% within VOMITING_	40.0%	60.0%	52.0%
	Paste	Count	14	18	32
		% within VOMITING_	23.3%	20.0%	21.3%
Total		Count	60	90	150
Pearson Chi-Square= 6.707* p<0.05 S		% within VOMITING_	100.0%	100.0%	100.0%

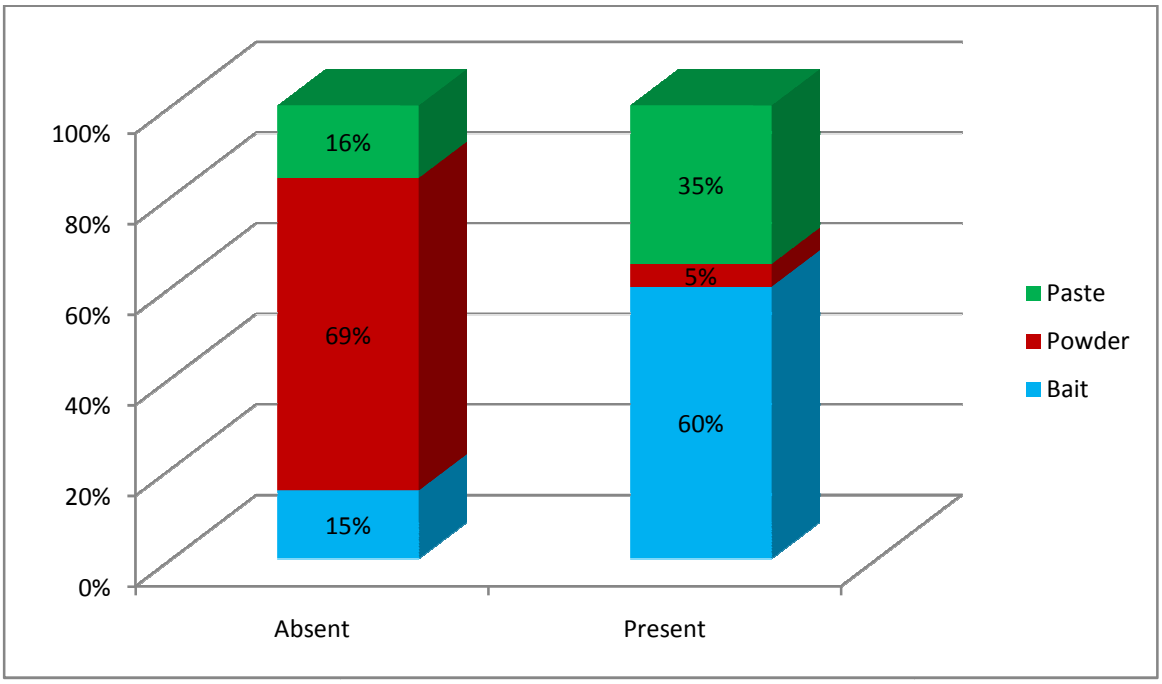


Most common presentation is abdominal pain.60% people from powder consumption, 20% are in bait group and 20% from paste. In our study, vomiting is more common in powder consumption

CROSSTAB

			HEMATEMESIS		Total
			Absent	Present	
Content_	Bait	Count	16	24	40
		% within HEMATEMESIS	14.5%	60.0%	26.7%
	Powder	Count	76	2	78
		% within HEMATEMESIS	69.1%	5.0%	52.0%
	Paste	Count	18	14	32
		% within HEMATEMESIS	16.4%	35.0%	21.3%
	Total	Count	110	40	150
		% within HEMATEMESIS	100.0%	100.0%	100.0%
Pearson Chi-Square= 50.674* p<0.05 1 S 5% patients from powder, 35% in paste 60% in bait					

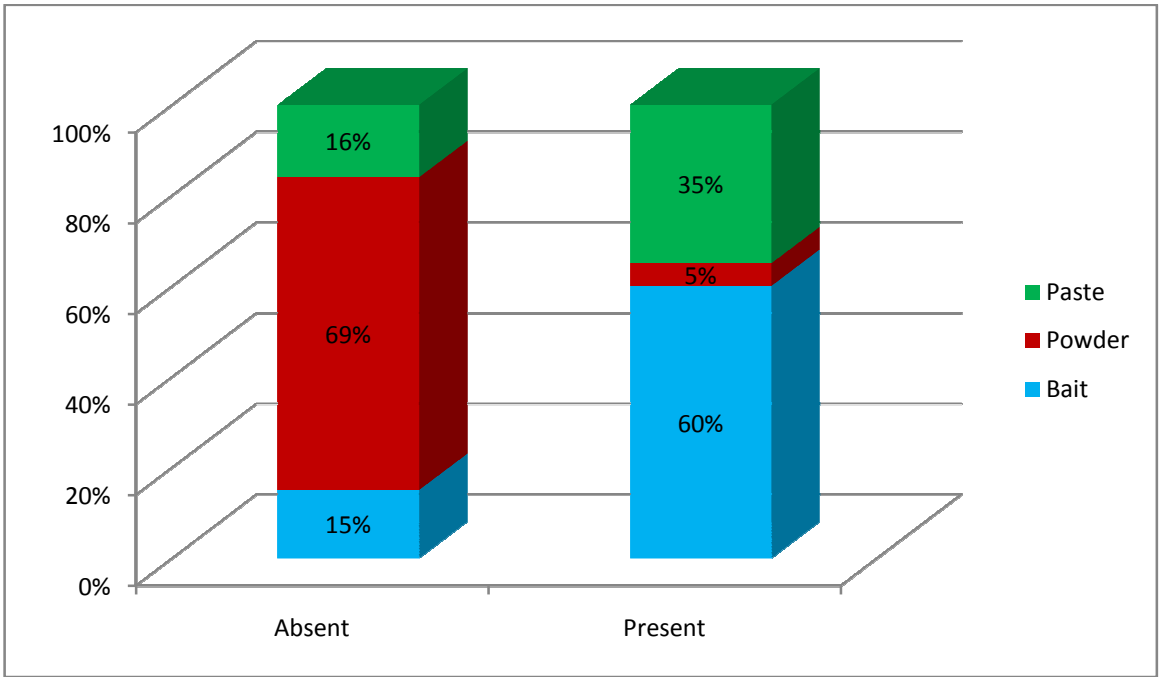
HEMETEMESIS



Persons consumed bait, 24 patient presented with hemetemesis in which 14 of them consumed paste

MALENA

			MELENA		Total
			Absent	Present	
Content_	Bait	Count	16	24	40
		% within MELENA	14.5%	60.0%	26.7%
	Powder	Count	76	2	78
		% within MELENA	69.1%	5.0%	52.0%
	Paste	Count	18	14	32
		% within MELENA	16.4%	35.0%	21.3%
Total		Count	110	40	150
		% within MELENA	100.0%	100.0%	100.0%
Pearson Chi-Square= 50.674* p<0.05 1 S					

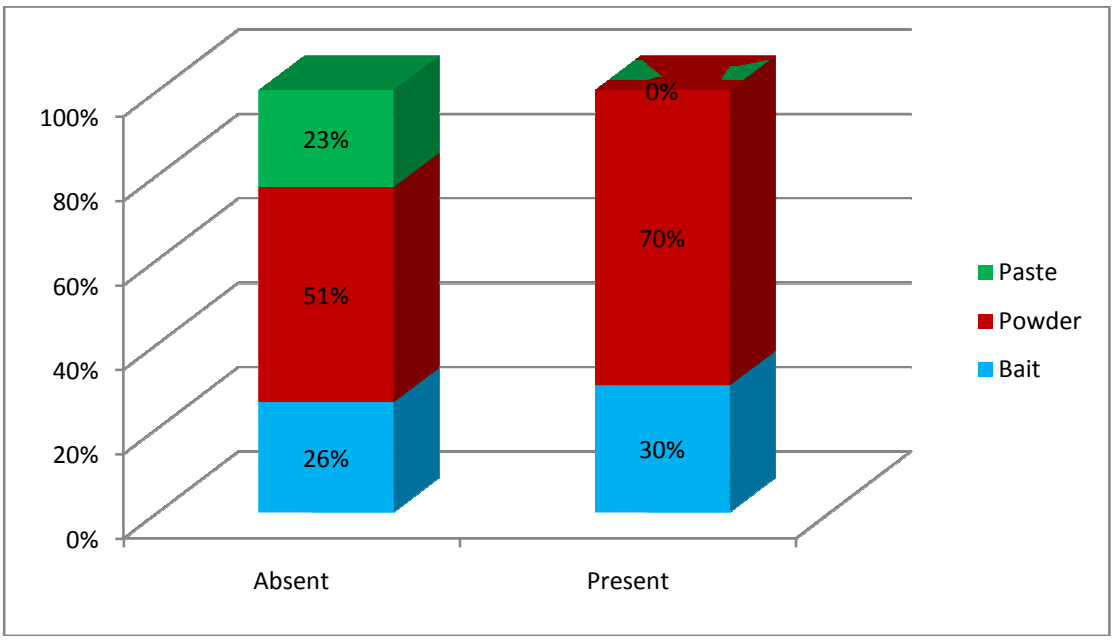


35 patients from paste, 60% from bait , remaining 5 % from powder.

CROSS TAB

			HEMATURIA		Total
			Absent	Present	
Content_	Bait	Count	37	3	40
		% within HEMATURIA	26.4%	30.0%	26.7%
	Powder	Count	71	7	78
		% within HEMATURIA	50.7%	70.0%	52.0%
	Paste	Count	32	0	32
		% within HEMATURIA	22.9%	0.0%	21.3%
Total		Count	140	10	150
		% within HEMATURIA Pearson Chi-Square=2.998 p<2.23N S	100.0%	100.0%	100.0%

HEMATURIA



Totally 10 patients presented with hematuria, in which 70% from powder consumption and 30% from bait

CROSS TAB

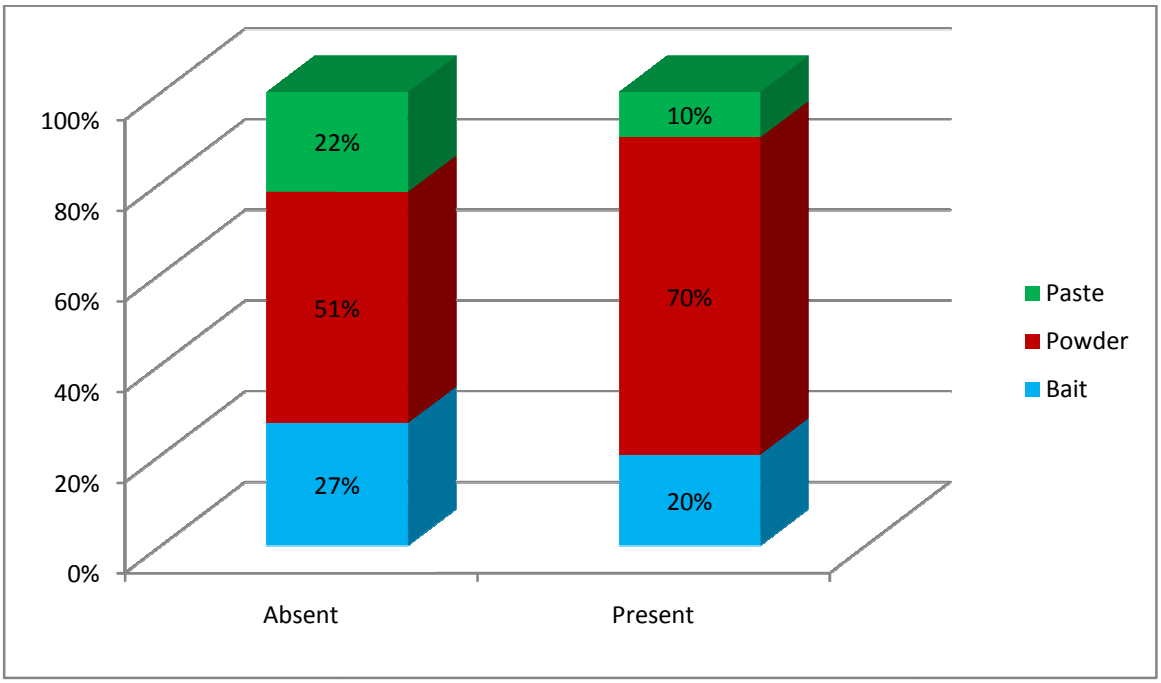
			GUMBLEED		Total
			Absent	Present	
Content_	Bait	Count	38	2	40
		% within GUMBLEED	27.1%	20.0%	26.7%
	Powder	Count	71	7	78
		% within GUMBLEED	50.7%	70.0%	52.0%
	Paste	Count	31	1	32
		% within GUMBLEED	22.1%	10.0%	21.3%
Total		Count	140	10	150
		% within GUMBLEED	100.0%	100.0%	100.0%

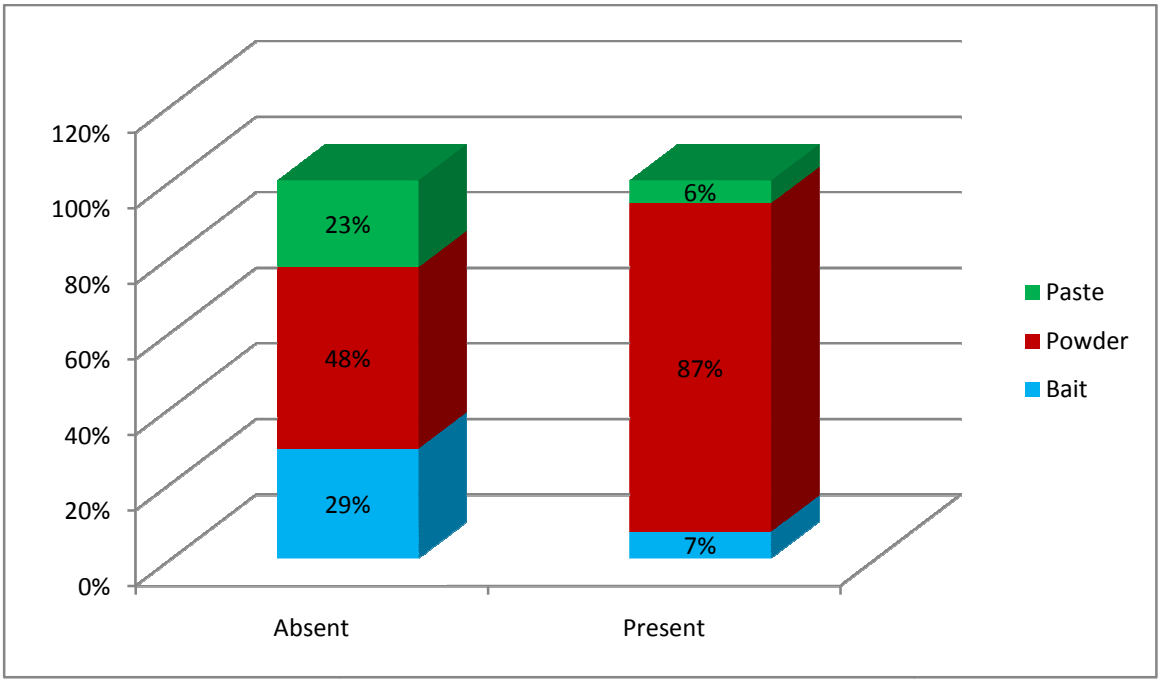
Gum bleed: powder 70% ,bait 20%, 10%paste

7 patients in powder,2 patients in bait, 1 patients in paste

140 patients without any complaints

Pearson Chi-Square= 1.491 p= .474 NS





Totally 15 patients presented with abdominal pain, in which 13 patients from powder, 1 from bait and paste

CROSSTAB

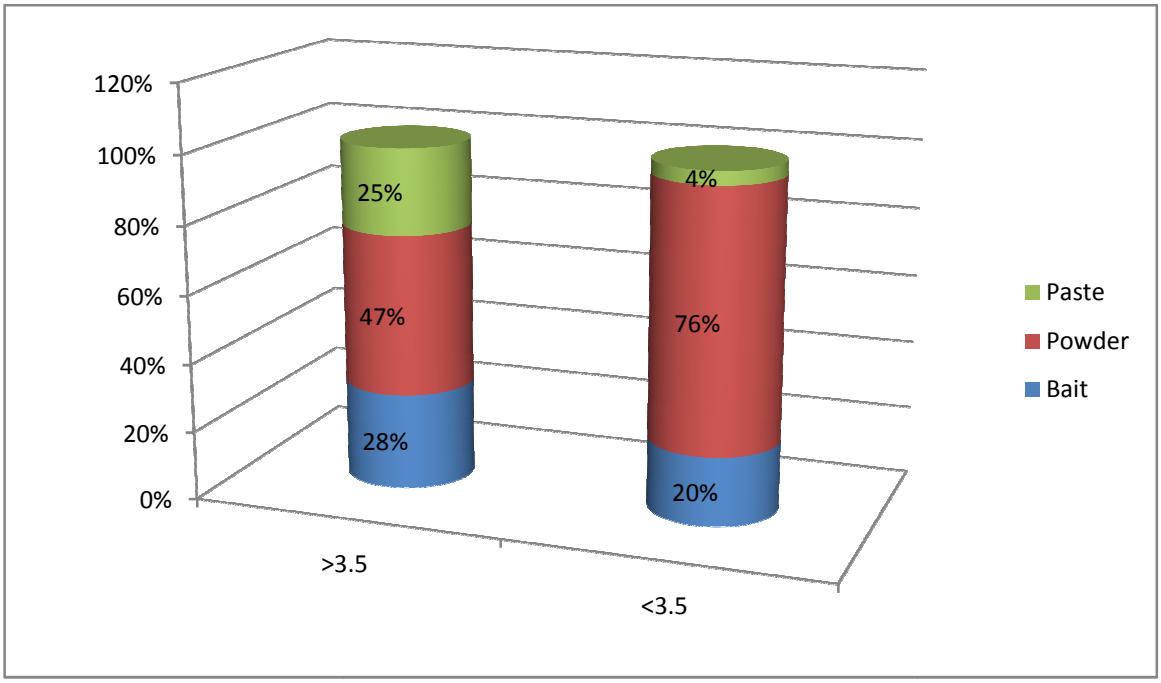
			ABDOMINAL_ PAIN		Total
			Absent	Present	
Content_	Bait	Count	39	1	40
		% within ABDOMINAL_PAIN	28.9%	6.7%	26.7%
	Powder	Count	65	13	78
		% within ABDOMINAL_PAIN	48.1%	86.7%	52.0%
	Paste	Count	31	1	32
		% within ABDOMINAL_PAIN	23.0%	6.7%	21.3%
Total		Count	135	15	150
		% within ABDOMINAL_PAIN	100.0%	100.0%	100.0%
Pearson Chi-Squar8.032 p<0.05 S **Abdominal pain**					

			POTASSIUM		Total
			>3.5	<3.5	
Content –	Bait	Count	35	5	40
		% within POTASSIUM	28.0%	20.0%	26.7%
	Powder	Count	59	19	78
		% within POTASSIUM	47.2%	76.0%	52.0%
	paste	Count	31	1	32
		% within POTASSIUM	24.8%	4.0%	21.3%
	Total	Count	125	25	150
		% within POTASSIUM	100.0%	100.0%	100.0%

Pearson Chi-Square= 8.048*p<0.001

Low level of blood potassium in powder in take.

powder 76%,bait 24%,paste 4%.



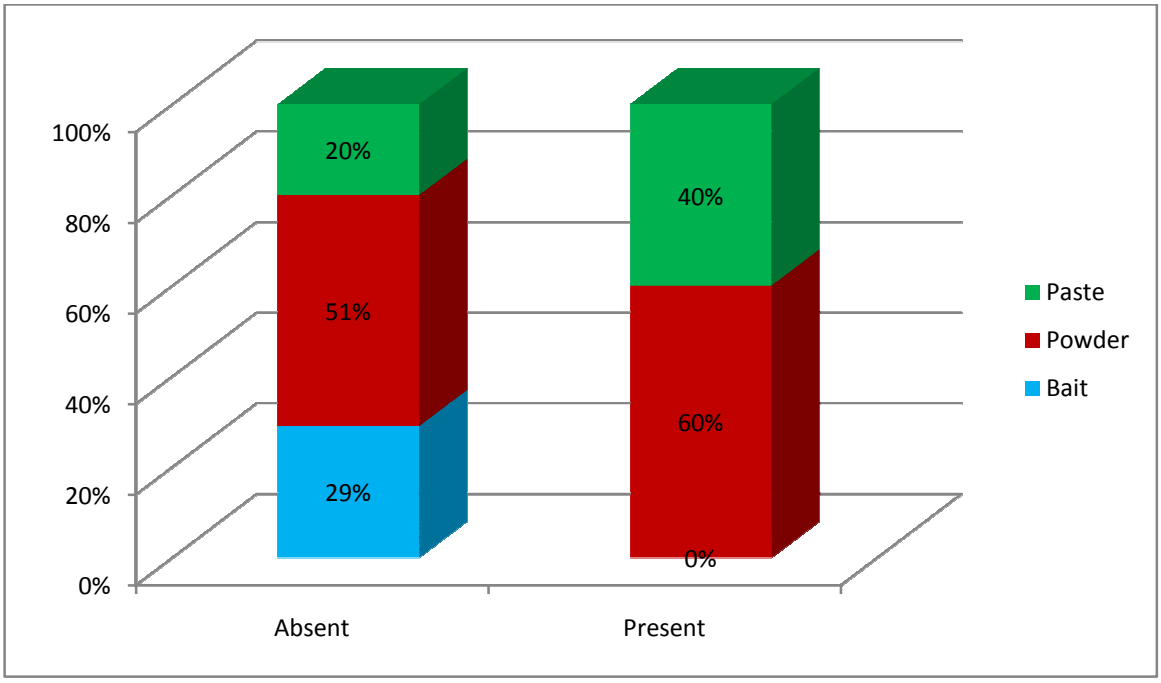
CROSSTAB

			SEIZURES_		Total
			Absent	Present	
Content_	Bait	Count	40	0	40
		% within SEIZURES_	28.6%	0.0%	26.7%
	Powder	Count	72	6	78
		% within SEIZURES_	51.4%	60.0%	52.0%
	Paste	Count	28	4	32
		% within SEIZURES_	20.0%	40.0%	21.3%
Total		Count	140	10	150
		% within SEIZURES_	100.0%	100.0%	100.0%

Pearson Chi-Square = 4.739 p= 0.094 N S

10 had this complaints, in that 60% in powder

40% in paste and 0% in bait



Some patients presented with seizures 60% are in powder and 40% in paste

CROSSTAB

			ALTERED_SENSORIUM		Total
			Absent	Present	
Content_	Bait	Count	40	0	40
		% within ALTERED_SENSORIUM	27.6%	0.0%	26.7%
	Powder	Count	77	1	78
		% within ALTERED_SENSORIUM	53.1%	20.0%	52.0%
	Paste	Count	28	4	32
		% within ALTERED_SENSORIUM	19.3%	80.0%	21.3%
Total		Count	145	5	150
		% within ALTERED_SENSORIUM	100.0%	100.0%	100.0%
Pearson Chi-Square =10.743* p<0.05 S					

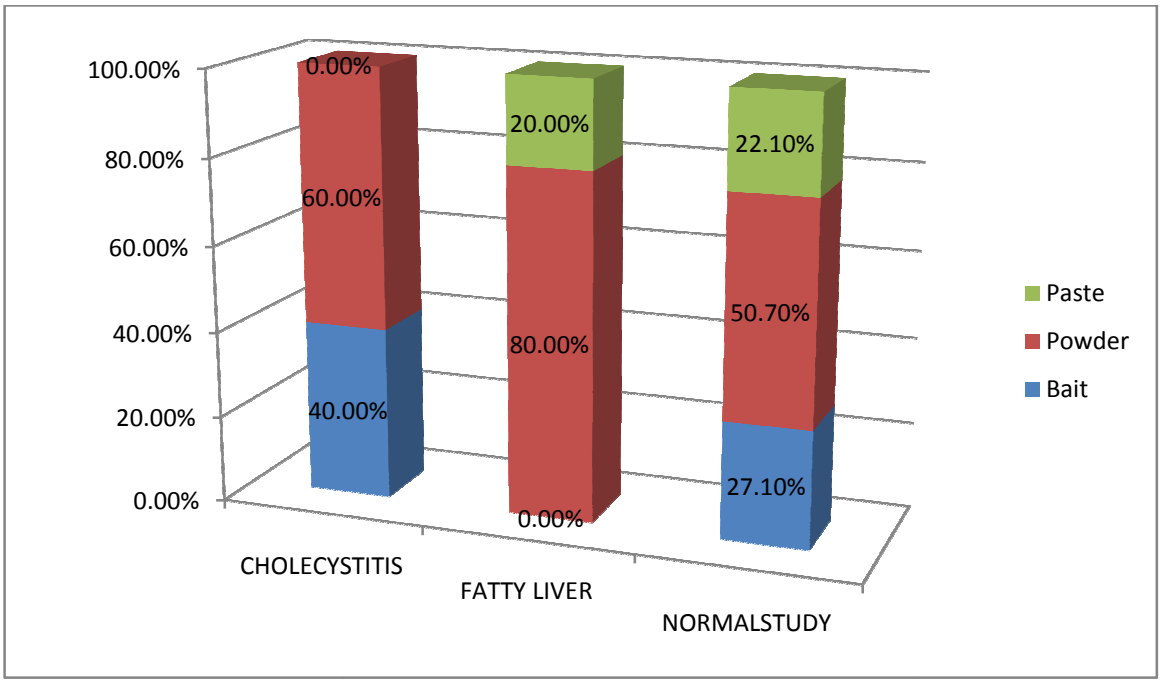
CONTENT_ * ULTRASOUND_ABDOMEN CROSSTABULATION

			ULTRASOUND_ABDOMEN			Total
			CHOLECYSTITIS	FATTY LIVER	NORMALSTUDY	
Content_	Bait	Count	2	0	38	40
		% within ULTRASOUND_ABDOMEN	40.0%	0.0%	27.1%	26.7%
	Powder	Count	3	4	71	78
		% within ULTRASOUND_ABDOMEN	60.0%	80.0%	50.7%	52.0%
	Bait	Count	0	1	31	32
		% within ULTRASOUND_ABDOMEN	0.0%	20.0%	22.1%	21.3%
Total		Count	5	5	140	150
		% within ULTRASOUND_ABDOMEN	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square=3.652 p>0.05 (0.455)

80% in powder intake.140 patients have no changes and have normal study.

20% in paste


100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
0.00%
60.00%
40.00%
20.00%
80.00%
0.00%
22.10%
50.70%
27.10%
CHOLECYSTITIS
FATTY LIVER
NORMALSTUDY
Paste
Powder
Bait

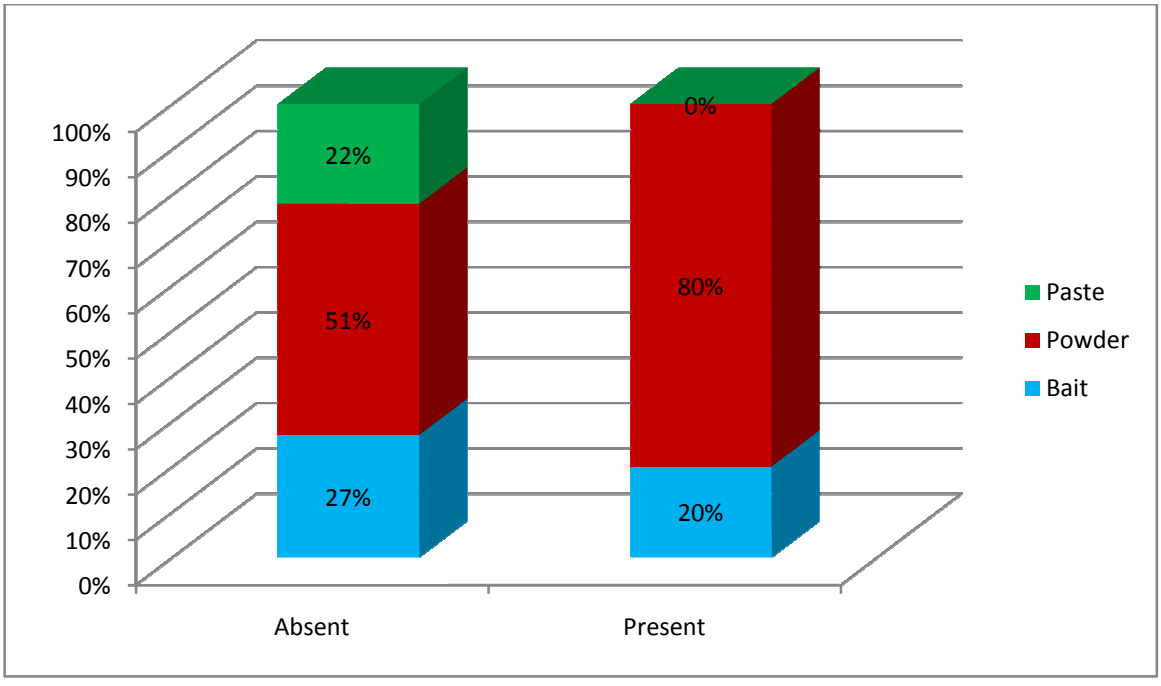
CROSSTAB

		HEADACHE		Total
		Absent	Present	
Bait	Count	39	1	40
	% within HEADACHE	26.9%	20.0%	26.7%
Powder	Count	74	4	78
	% within HEADACHE	51.0%	80.0%	52.0%
Paste	Count	32	0	32
	% within HEADACHE	22.1%	0.0%	21.3%
Total	Count	145	5	150
	% within HEADACHE	100.0%	100.0%	100.0%

Pearson Chi-Square = 1.969 p= 0.374 N S

5 patients had this complaints.

20% bait

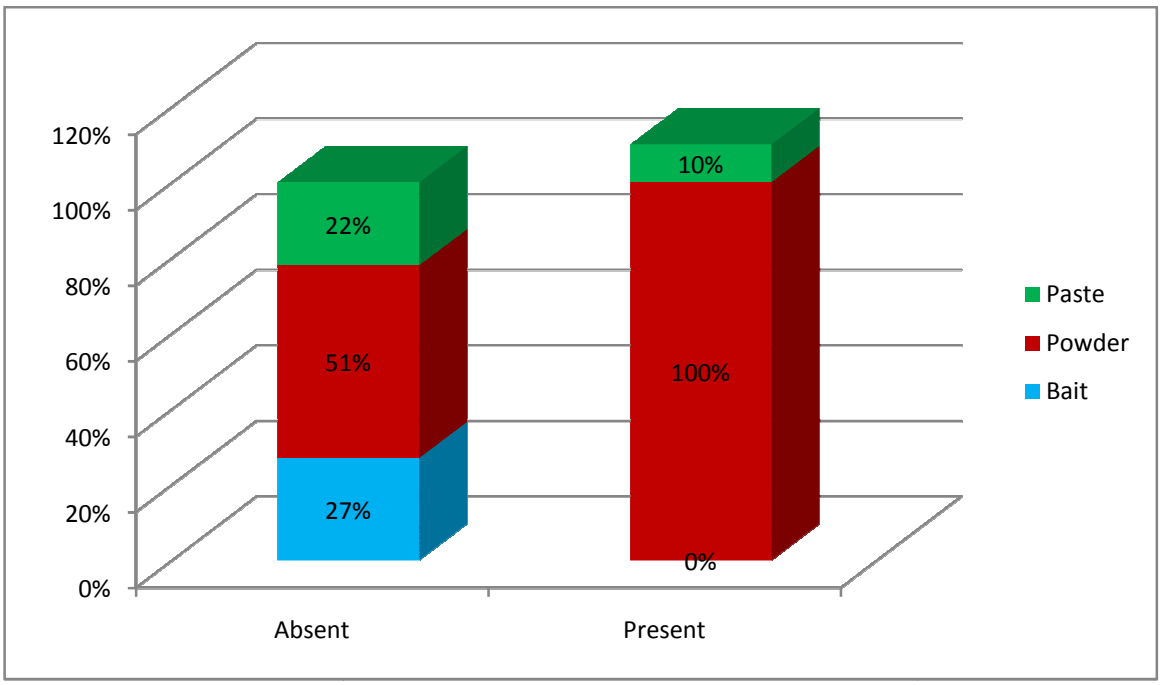


CROSSTAB

			WEEKNESS_OF_LIMBS_		Total
			Absent	Present	
Content_	Bait	Count	40	0	40
		% within WEEKNESS_OF_LIMBS_	27.6%	0.0%	26.7%
	Powder	Count	73	5	78
		% within WEEKNESS_OF_LIMBS_	50.3%	100.0%	52.0%
	Paste	Count	32	0	32
		% within WEEKNESS_OF_LIMBS_	22.1%	0.0%	21.3%
	Total	Count	145	5	150
		% within WEEKNESS_OF_LIMBS_	100.0%	100.0%	100.0%

145 people without complaints.5 patients had this manifestations. 5 in powder form

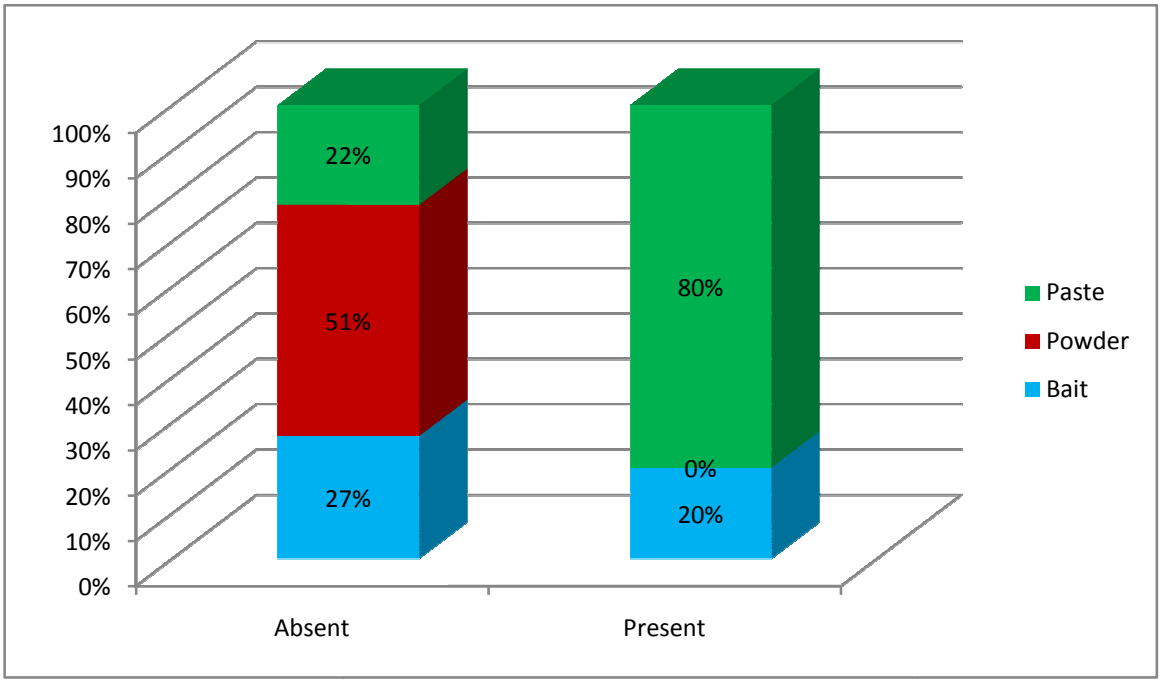
Pearson Chi-Square = 4.772 p =0.092 N S



CROSSTAB

			JAUNDICE		Total
			Absent	Present	
Content_	Bait	Count	38	2	40
		% within JAUNDICE	27.1%	20.0%	26.7%
	Powder	Count	78	0	78
		% within JAUNDICE	55.7%	0.0%	52.0%
	Paste	Count	24	8	32
		% within JAUNDICE	17.1%	80.0%	21.3%
Total		Count	140	10	150
		% within JAUNDICE	100.0%	100.0%	100.0%

Pearson Chi-Square = 23.036* p<0.05 S

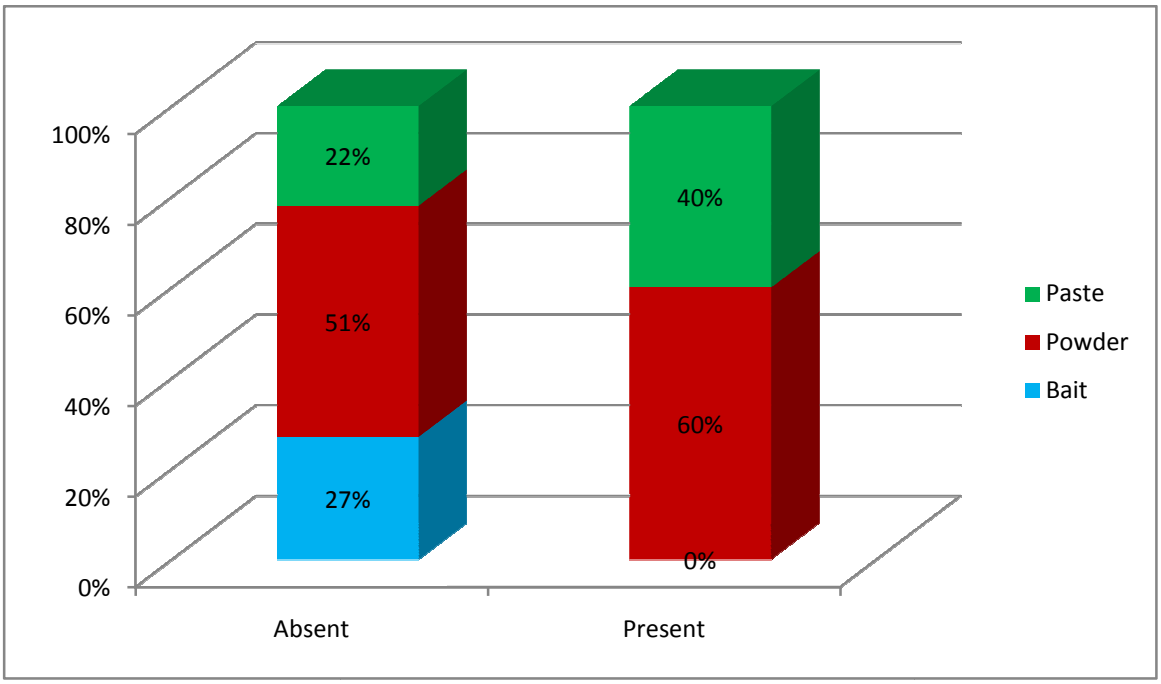


10 patients had this complaints,80% in paste form and 20% in bait form

CROSSTAB

			OLIGURIA		Total
			Absent	**Present**	
Content_	Bait	Count	40	0	40
		% within OLIGURIA	27.6%	0.0%	26.7%
	Powder	Count	75	3	78
		% within OLIGURIA	51.7%	60.0%	52.0%
	Paste	Count	30	2	32
		% within OLIGURIA	20.7%	40.0%	21.3%
Total		Count	145	5	150
		% within OLIGURIA	100.0%	100.0%	100.0%

Pearson Chi-Square = 2.288 p=03.19 NS



60% come under powder and 40%in in paste form, 145 patients

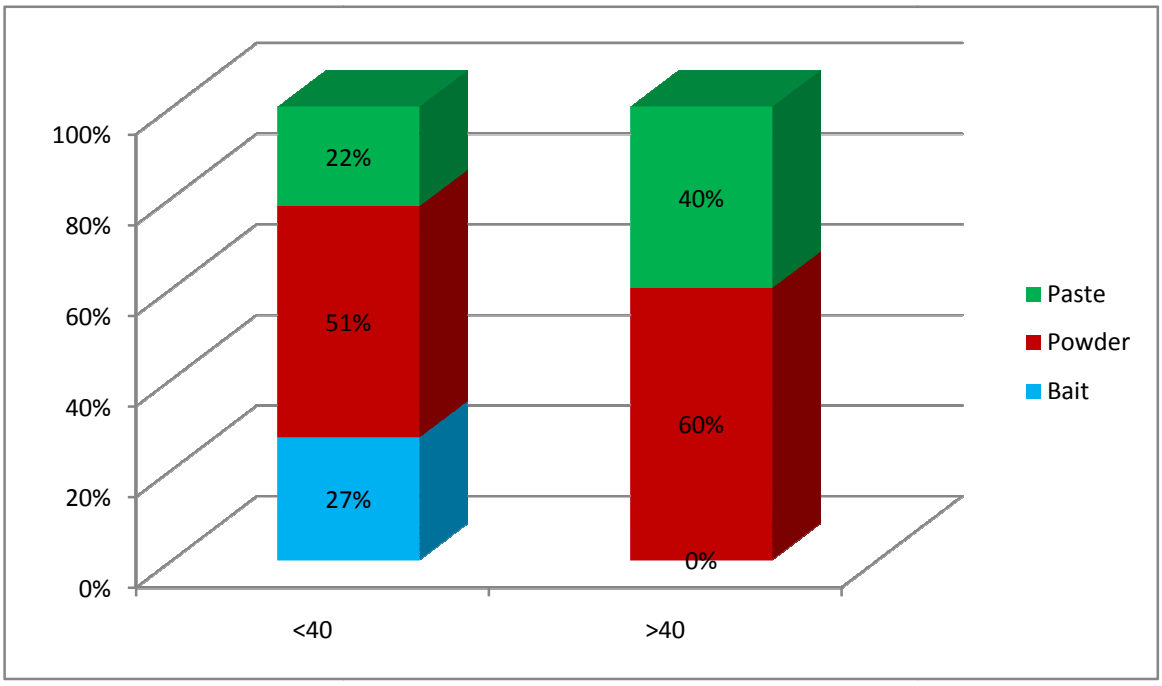
without any complaints

CROSSTAB

			UREIA		Total
			<40	>40	
Content_	Bait	Count	40	0	40
		% within UREIA	27.6%	0.0%	26.7%
	Powder	Count	75	3	78
		% within UREIA	51.7%	60.0%	52.0%
	Paste	Count	30	2	32
		% within UREIA	20.7%	40.0%	21.3%
Total		Count	145	5	150
		% within UREIA	100.0%	100.0%	100.0%

Pearson Chi-Square =2.288 p=0.319 NS

60% from powder intake,40% in paste. 145 patients with normal value with less than 40 urea value.

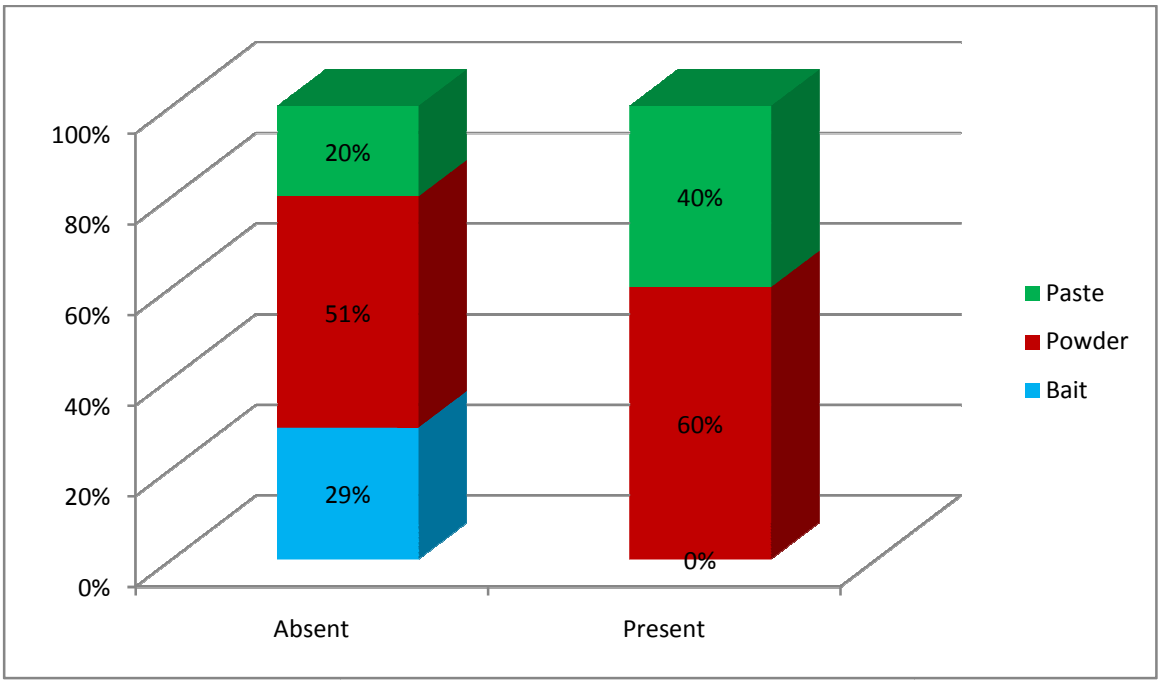


CHEST PAIN

Crosstab

			CHEST PAIN		Total
			Absent	Present	
Content_	Bait	Count	40	0	40
		% within CHEST PAIN	28.6%	0.0%	26.7%
	Powder	Count	72	6	78
		% within CHEST PAIN	51.4%	60.0%	52.0%
	Paste	Count	28	4	32
		% withinCHEST PAIN	20.0%	40.0%	21.3%
Total		Count	140	10	150
		% withinCHEST PAIN	100.0%	100.0%	100.0%

Pearson Chi-Square = 4.739 p= 0.094 N S

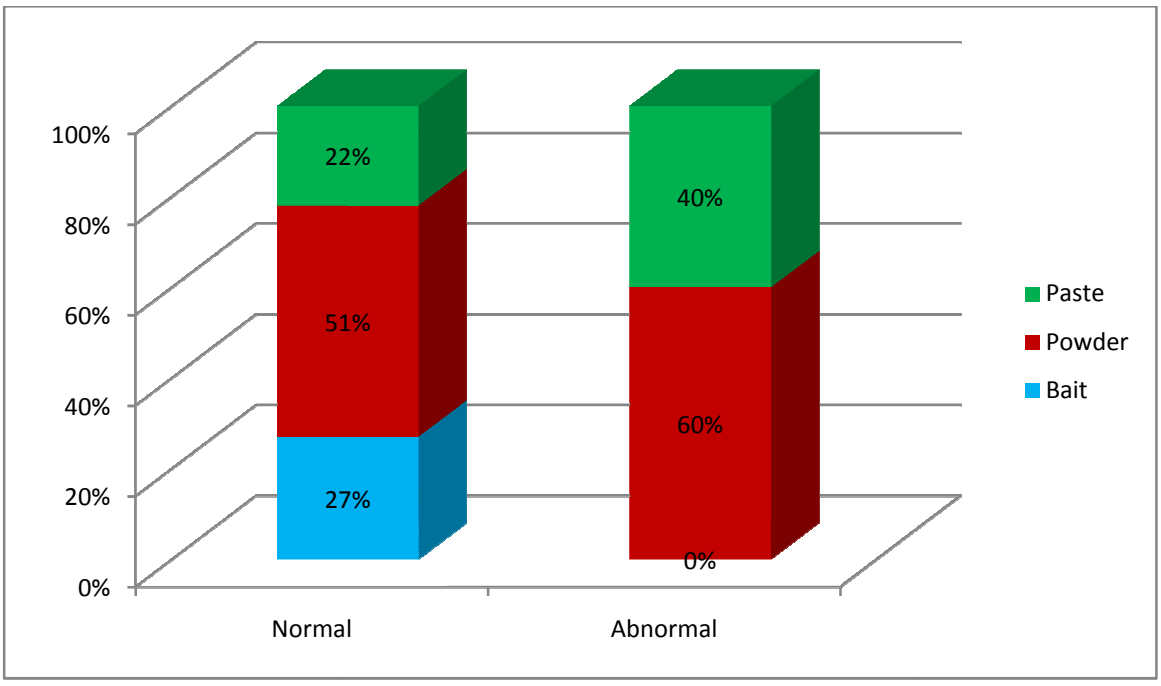


10 patients develop chest pain, whereas the remaining 140 does not produce any chest pain.

			CREATININE		Total
			0.6- 1 normal	abnormal	
Content_	Bait	Count	40	0	40
		% within CREATININE	27.6%	0.0%	26.7%
	Powder	Count	75	3	78
		% within CREATININE	51.7%	60.0%	52.0%
	Paste	Count	30	2	32
		% within CREATININE	20.7%	40.0%	21.3%
Total		Count	145	5	150
		% within CREATININE	100.0%	100.0%	100.0%

Pearson Chi-Square =2.288 p=0.319 NS

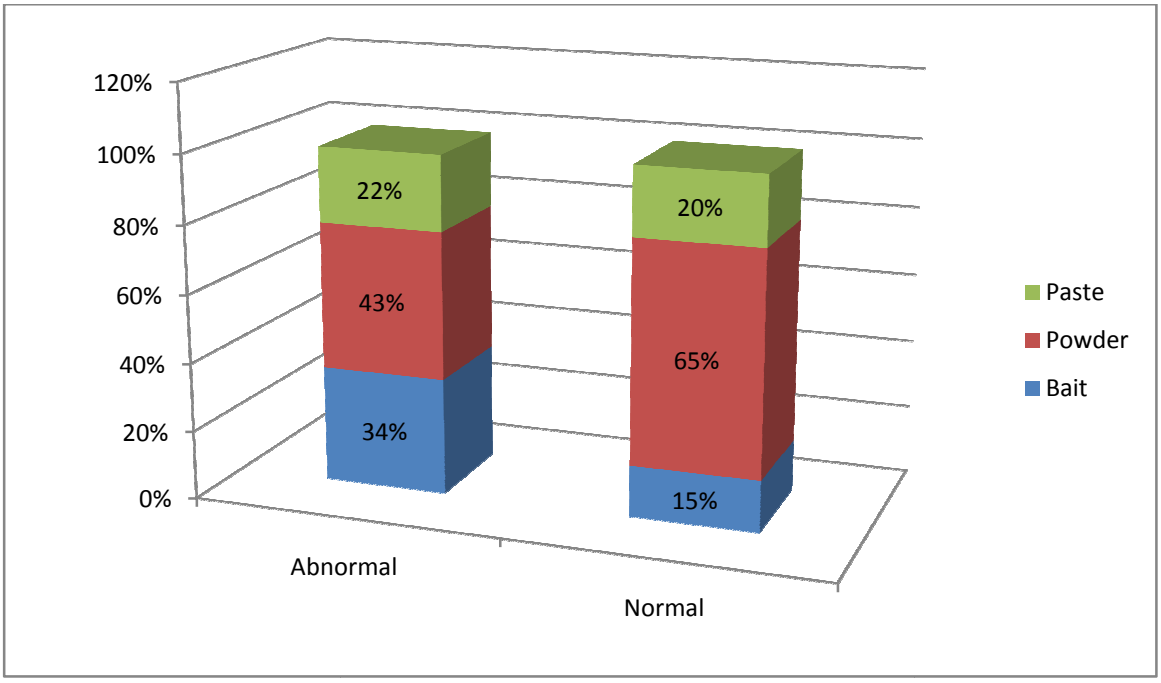
lesser amount increase in creatinine value. not much elevation seen



CONTENT_ * PT/INR CROSSTABULATION

			PTINR		Total
			Abnormal	Normal	
Content_	Bait	Count	31	9	40
		% within PT/INRr	34.4%	15.0%	26.7%
	Powder	Count	39	39	78
		% withinPT/INR	43.3%	65.0%	52.0%
	Paste	Count	20	12	32
		% within PT/INR	22.2%	20.0%	21.3%
Total		Count	90	60	150
		% within PT/INR	100.0%	100.0%	100.0%

Chi square = 8.438* p<0.05 S



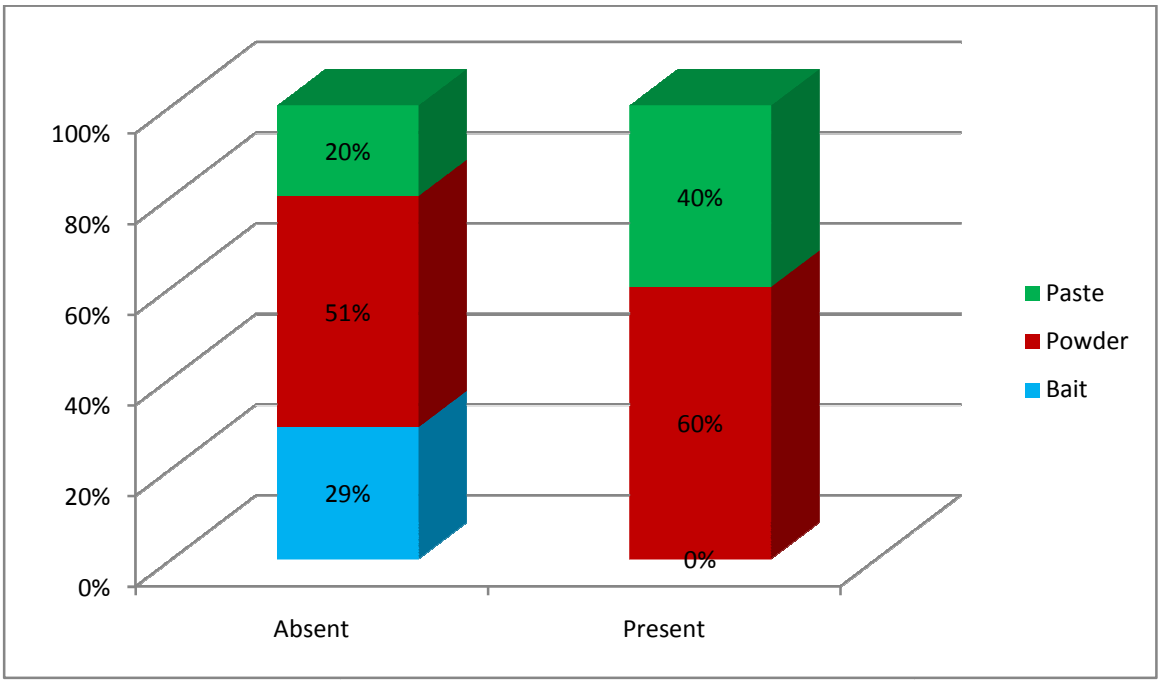
60 patients had complaints. Paste and bait had complications

BREATHLESSNESS

CROSSTAB

			BREATHLESSNES		Total
			Absent	Present	
Content_	Bait	Count	40	0	40
		% within breathlessness	28.6%	0.0%	26.7%
	Powder	Count	72	6	78
		% within breathlessness	51.4%	60.0%	52.0%
	Paste	Count	28	4	32
		% withinbreathlessness	20.0%	40.0%	21.3%
Total		Count	140	10	150
		% withinbreathlessness	100.0%	100.0%	100.0%

Pearson Chi-Square = 4.739 p= 0.094 N S

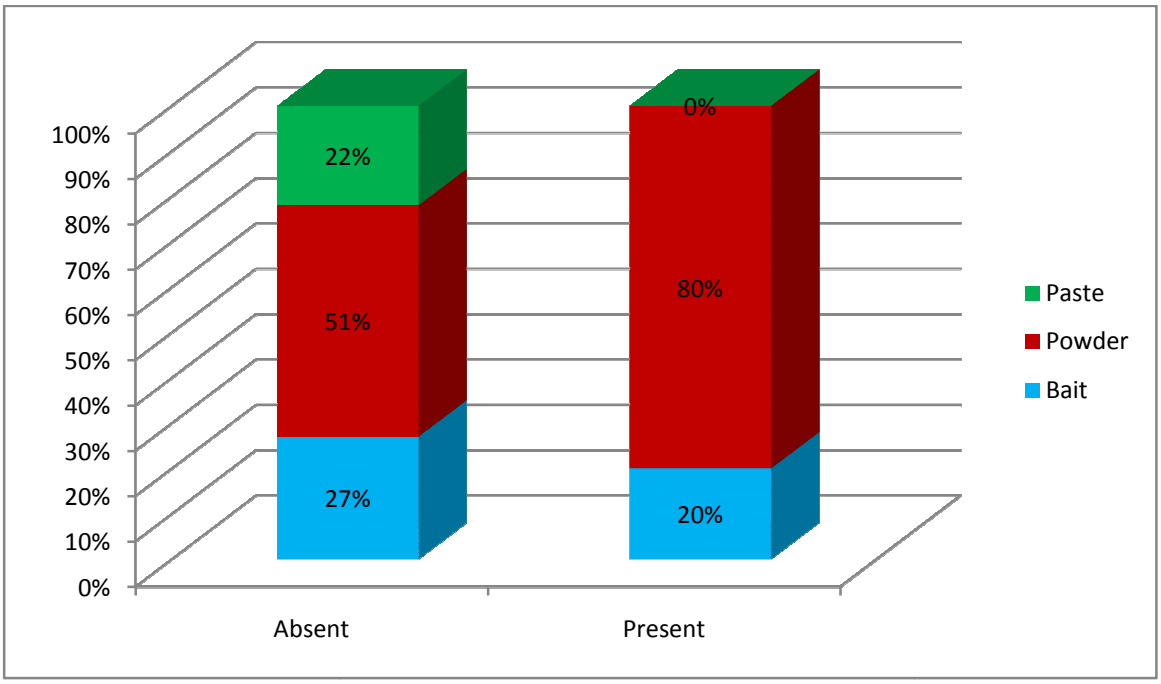


Few people only had this complaints, not much elevated. Percentage present in powder form

CROSSTAB

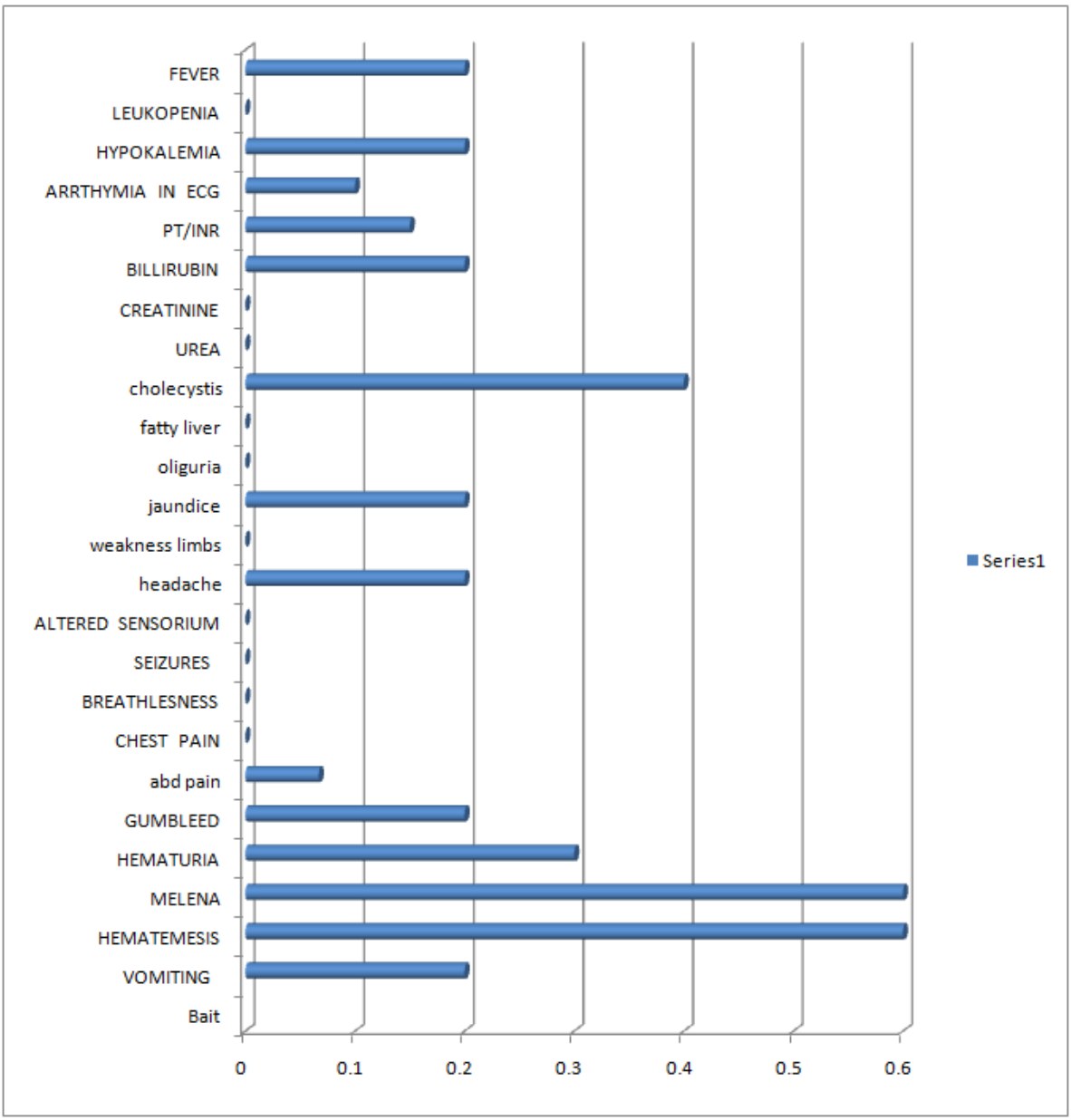
			LEUKOPENIA		Total
			Absent	Present	
Content_	Bait	Count	39	1	40
		% within leucopenia	26.9%	20.0%	26.7%
	Powder	Count	74	4	78
		% within leucopenia	51.0%	80.0%	52.0%
	Paste	Count	32	0	32
		% within leucopenia	22.1%	0.0%	21.3%
Total		Count	145	5	150
		% within leucopenia	100.0%	100.0%	100.0%

Pearson Chi-Square = 1.969 p= 0.374 N S

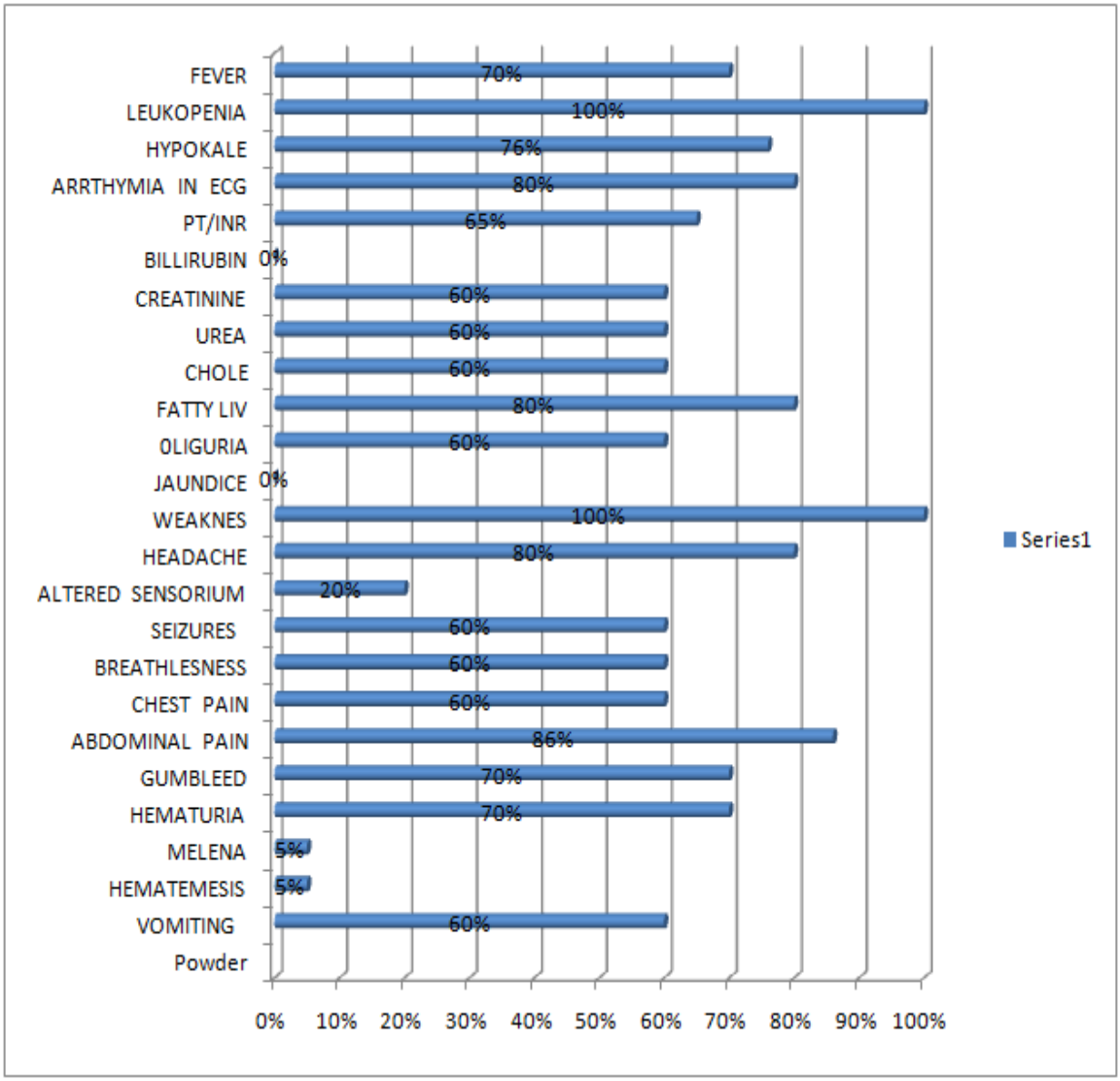


5 patients had this complaints, not much elevation , in that

80% in powder form

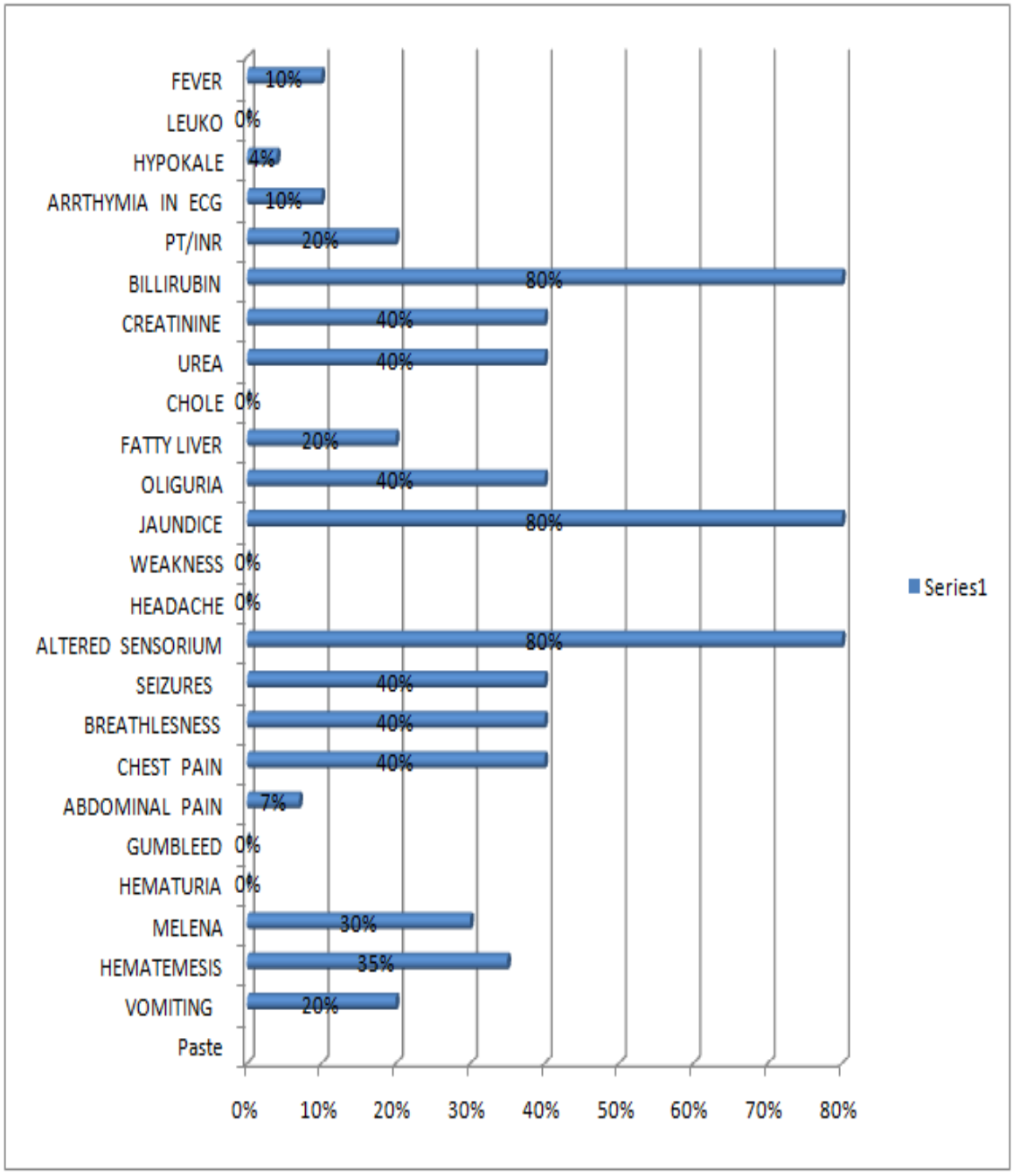


CLINICAL AND BIOCHEMICAL CHART OF BAIT



CLINICAL AND BIOCHEMICAL CHART OF

POWDER POISONING



CLINICAL AND BIOCHEMICAL CHART OF PASTE POISONING

DISCUSSION

DISCUSSION

Rodenticide poisoning and its manifestation, clinically and biochemically. This study is based on different form of Rodenticide. The sample size are 150 patients.

AGE: **Age classified as** 20-40 years, 41-60 years and more than 60 years.

In 20-40years = 65.3% consumed.

In 41-60years = 24%intake.

In >61years = 10.7% taken.

More number of poison consumed in the age group between 20 to 40 years of age and mostly young people are involved in this. Young people are highly affected by the suicidal intention.(98 out of 150 patients)

Age group between 41 to 60 years are moderate in number (36 out of 150)

Older age group are less in number, in consuming the poison (16 out of 150 patients)

SEX : Female are mostly affected than male. In our study the poison intake are more in female .i.e 85 out of 150 patients are female and 65 out of 150 patients are male.

Female : 56.7%

Male : 43.3%

This study shows that intention to attempt is more in female.

DOSE:

5-30grams : 78%

31-50 grams : 13.3%

More than 50 grams : 8.7%

It shows that out of 150 patients, 117 have consumed 5-30grams, 20 have consumed 31-50 grams and 13 have consumed more than 50 grams.

AMOUNT CONSUMED IN DIFFERENT FORMS

Bait form: People have consumed poison more in bait form (5-30 grams) which is around 65%. Those who have consumed between 31-50 grams is about 30% and those who have consumed more than 50 grams are very few which, is just 5%.

Powdered form: The intake in powdered form is about 89% (5-30 grams), and those who have taken 31-50 grams comes to 6.4%, and those who have taken more than 50 grams has 3.8%.

Paste form: Around 65.6% have consumed 5-30 grams in paste form, whereas 9.4% has taken between 31-50 grams and more than 50 grams comes to 25% of paste consumption.

DURATION:

Time taken by the people to reach hospital: 4% of people reach hospital in less than 6 hours, 12% of people reach within 6-12 hours, 10% of people reach within 12-24 hours, 67.3% of people reach within 24-72 hours, 3.3% of people reach within 3-7 days, and also 3.3% of people reach within 7-14 days.

DEATH

According to the study, out of 150 patients, 10 patients have died. From this 10 patients, 8 patients have died due to consumption in paste form and 2 patients have died due to the consumption in bait form.

DOSAGE AFFECTING DEATH

Those who have taken more than 50 grams have high death rate(10 out of 150 patients) whereas those taken from 30-50 grams and 5-30 grams does not show any death rate.

CLINICAL PROFILE

VOMITING: Out of 150 patients, 90 of them suffer vomiting, in which 54 of them have taken in powdered form, 18 of them in bait form and again 18 of them in paste form.

Powder : 60%

Paste : 20%

Bait : 20%

ABDOMINAL PAIN:

Paste : 6.7%

Bait : 6.7%

Powder : 86.7%

Only 15 out of 150 patients have complained Abdominal pain, in which 13 patients have taken it in powdered form.

HEMATEMESIS

40 out of 150 patients have bleeding manifestations in the form of blood vomiting. 24 persons from bait consumption, 14 from paste consumption and 2 people from powder intake.

POWDER : 5%

BAIT : 60%

PASTE : 35%

MALENA:

This condition occurs around 24 persons from bait consumption, 14 from paste consumption and 2 people from powder intake.

Paste : 35%

Bait : 60%

Powder : 5%

ALTERED SENSORIUM:

Out of 150 patients, only 5 of them have Altered sensorium findings, in which 4 of them have taken in paste form and 1 of them in powdered form. This Altered sensorium occurs due to hepatic dysfuntion

Powder : 20%

Paste : 80%

Bait : 0%.

Its due to hepatic dysfunction and hepatic encephalopathy main clinical manifestation in the study.

JAUNDICE:

Paste	:	80%
Bait	:	20%
Powder	:	0%

In 150 patients only 10 patients were presented with jaundice, in which, 8 from paste intake and 2 from bait intake.

BILIRUBIN:

Paste	:	80%
Powder	:	0%
Bait	:	20%

Those who have jaundice will have elevated Bilirubin level in blood. It is commonly seen in paste consumption.

PT/INR:

Powder	:	43.3%
Paste	:	22.2%
Bait	:	34.4%

Totally 60 out of 150 patients have prolong bleeding time. Increase severity in all three forms of powder, paste and bait intake.

HYPOKALEMIA:

Bait	:	20%
Powder	:	76%
Paste	:	4%

Potassium value will become low in powder poisoning. Out of 25 patients, 19 of them have decreased K + level in serum.

LUNG INFILTRATION:

Very minimal amount of people get pulmonary edema. Here, powdered form involves major part in Lung Infilteration.

In powder 5% of people chest x-ray shows bilateral infiltration.

ULTRA SOUND ABDOMEN:

Some people who consumed in powder form carries changes in ultra sound abdomen. Bait rate is 40% in cholecystitis, powder carries 60% and nil rate in paste form.

Out of 150 patients, 5 Patients suffer Fatty liver, in which 4 of them due to powder poisoning and 1 from paste intake.

CHEST PAIN AND BREATHLESSNESS:

Out of 150 patients, 10 suffer from chest pain and breathlessness, in which 6 of them has taken in powdered form and 4 of them in paste form.

FEVER:

It is an insignificant clinical profile, more involved in powder form around 70%.

HEMATURIA:

Out of 150 patients, 10 suffer from Hematuria, in which 7 of them has taken powdered form and 3 of them taken in bait form.

GUMBLEED:

Gum bleeding involves 7 patients consumed in powdered form, 2 from bait and 1 from paste intake.

SEIZURES:

Seizures occurs in 6 patients who took in powdered form. It is a rare presentation in our study**.**

HEADACHE:

It also rare entity insignificant role in clinical manifestation**.**

WEAKNESS OF LIMBS:

Cases reported in powder form only in this study.

OLIGURIA:

Minimal amount of patients who consumed powder, presented with decreased urine output. Out of 150 patients, 3 persons from powder, 2 patients from paste suffer Oliguria.

UREA AND CREATININE:

Urea more than a normal range in patients, 3 in powder followed by 2 in paste. End results shows 5 patients out of 150.

2 persons from paste and 3 persons from bait shows Creatinine.

ARRYTHMIA IN ECG:

10 patients show abnormal ECG in which 8 of them consumed powder and the remaining in paste form.

LYMPHOCYTOPENIA:

In 150 Patients, 5 patients clinical profile shows decreased white blood cells. Mostly seen in powdered form.

CONCLUSION

1. In our study the most common Rodenticide consumed was rat killer powder, followed by paste and then by bait.
2. The paste form of Rodenticide contributes to higher death rate when compared with other forms.
3. Female consumption is higher than the male consumption.
4. The Age group between 20-40 years have the most consumption of poison intake.
5. The common complaint of poison intake is vomiting, out of which powdered form has the most percentage.
6. Death occurs only when the patients have consumed more than 50 grams.
7. Most of the people reach hospital within 24-72 hours only.
8. More people suffer bleeding tendency due to Bait consumption.
9. More number of persons take lesser amount of poison around 5-30 gram.
10. More patients die due to the consumption in Paste form.
11. Hepatic encephalopathy is caused due to high consumption in paste form.
12. High intake in powder form leads to Hypokalemia.

13. N-acetyl cysteine plays a vital role in non liver transplant patients who consumed Rodenticide poison.
14. In this study, haematemesis and melaena are the major symptoms in bait consumption.
15. Jaundice and elevated liver parameters are the manifestations in paste consumption.

SUMMARY

SUMMARY

Rodenticide is a most common poisoning in India. It is easily available due to its low cost. This study is based on the patients clinical and biochemical profile, with Rodenticide consumption in Madras Medical College, Chennai. The participants were briefly explained about this study and the procedures. Proper written consent was got from them. Before the study, the history of the patients were noted and relevant investigation was done.

The most common forms of Rodenticides available are Bait, Powder and Paste, where Powder form was consumed by most of the patients. But the study reveals that paste consumption has high death rate when taken above 50 grams. Most people also suffer bleeding tendency due to Bait consumption. Hypokaelemia and Hepatic encephalopathy are also caused due to the intake of this Rodenticides.

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ANNEXURES

PROFORMA

PATIENT DETAILS:

Name: Age: Sex:

IP No. :

PRESENTING COMPLAINTS

H/o fever

H/o nausea/vomiting

H/o hematemesis,

H/O hematuria,

H/o melaena,

H/o gumbleed

H/o any other bleeding manifestation

H/o abdominal pain

H/o abdominal distension

H/o loose stools

H/o chestpain

H/o breathlessness

H/o seizures,altered sensorium

H/o weakness of limbs

H/o intake of any drugs

Co – Morbid Illness :

Significant Past History :

CLINICAL EXAMINATION:

Pulse : BP :

RR : Temp :

Pallor : Icterus :

CVS : RS :

P/A :

CNS:

INVESTIGATIONS :

Hemogram :

Liver function Test:

Renal Function Test :

BT/CT/PT/INR :

Stool occult blood

Blood Grouping :

ECG :

CXR :

USG Abdomen .

ABBREVATION

ARDS	-	Acute Respiratory Distress Syndrome
BT	-	Bleeding Time
BP	-	Blood pressure
CBC	-	Complete Blood Count
Ct	-	Clotting time
CT	-	Computed Tomography
CXR	-	Chest x ray
ECG	-	Electrocardiogram
HB	-	Haemoglobin
HE	-	Hepatic Encephalopathy
INR	-	International normalized ratio
LFT	-	Liver Function Test
Na	-	Sodium
PT	-	Prothrombin Time
RFT	-	Renal Function Test
SGOT	-	serum glutamic oxaloacetic transaminase
SGPT	-	serum glutamic pyruvic transaminase
TC	-	Total count
USG	-	Ultrasonogram

INFORMATION SHEET

We are conducting a study on **"A STUDY ON THE CLINICAL AND BIOCHEMICAL PROFILE OF PATIENTS ADMITTED IN TOXICOLOGY WARD WITH RODENTICIDE POISONING"** among patients attending Rajiv Gandhi Government General Hospital, Chennai and for that your specimen may be valuable to us.

The purpose of this study is

1. Clinical and biochemical profile of patients with rodenticide ingestion.

We are selecting certain cases and if you are found eligible, we may be using your information which in any way do not affect your final report or management.

The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of benefits to which you are otherwise entitled.

The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of the Investigator Signature of Participant

Date:

Place:

PATIENT CONSENT FORM

Study Detail : **"A STUDY ON THE CLINICAL AND BIOCHEMICAL PROFILE OF PATIENTS ADMITTED IN TOXICOLOGY WARD WITH RODENTICIDE POISONING"**

Study Centre : Rajiv Gandhi Government General Hospital, Chennai.

Patient's Name :

Patient's Age :

In Patient Number :

Patient may check (☑) these boxes

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask question and all my questions and doubts have been answered to my complete satisfaction. ❑

I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving reason, without my legal rights being affected. ❑

I understand that sponsor of the clinical study, others working on the sponsor's behalf, the ethical committee and the regulatory authorities will not need my permission to look at my health records, both in respect of current study and any further research that may be conducted in relation to it, even if I withdraw from the study I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from this study. ❑

I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperate with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or well being or any unexpected or unusual symptoms. ❑

I hereby consent to participate in this study ❑

I hereby give permission to undergo complete clinical examination and diagnostic tests including hematological, biochemical, radiological tests. ❑

Signature/thumb impression

Patient's Name and Address:

Signature of Investigator

Study Investigator's Name :

Dr.SHOBANA.D,

ஆராய்ச்சி ஒப்புதல் கடிதம்

ஆராய்ச்சி தலைப்பு:

எலி கொல்லி விசம் உட்கொள்வதன் விளைவுகள் மற்றும் இரத்த நானங்களில் ஏற்படும் மாற்றங்கள் பற்றிய ஆய்வு

பெயர்: தேதி:

வயது: உள்நோயாளி எண்:

பால்: ஆராய்ச்சி சேர்க்கை எண்:

இந்த ஆராய்ச்சியின் விவரங்களும் அதன் நோக்கங்களும் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது. எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்து கொண்டு நான் எனது சம்மதத்தை தெரிவிக்கிறேன்.

எலிக் கொல்லி விசம் உட்கொள்வதன் விளைவுகள் மற்றும் இரத்த நானங்களில் ஏற்படும் மாற்றங்கள் பற்றிய ஆய்வு

மேற்கொண்ட பரிசோதனையின் போது ஏற்படக்கூடிய பின்விளைவுகளையும் முழுவதும் உணர்ந்து இந்த பரிசோதனைக்கு மனமார சம்மதிக்கிறேன்.

கையொப்பம்

ஆராய்ச்சி தகவல் தாள்

சென்னை இராஜிவ் காந்தி அரசு பொது மருத்துவமனையில் பற்றிய ஒரு ஆராய்ச்சி நடைபெற்று வருகிறது.

எலிக் கொல்லி விசம் உட்கொள்வதன் விளைவுகள் மற்றும் இரத்த நானங்களில் ஏற்படும் மாற்றங்கள் பற்றிய ஆய்வு

நீங்களும் இந்த ஆராய்ச்சியில் பங்கேற்க நாங்கள் விரும்புகிறோம். முடிவுகளை அல்லது கருத்துக்களை வெளியிடும் போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியிலிருத்து பின்வாங்கலாம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த சிறப்புப் பரிசோதனைகளின் முடிவுகளை ஆராய்ச்சியின் போது அல்லது ஆராய்ச்சியின் முடிவில் தங்களுக்கு அறிவிப்போம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

ஆராய்ச்சியாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

தேதி:

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI-3

EC Reg No.ECR/270/Inst./TN/2013
Telephone No. 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr.D.Shobana
Postgradaute M.D.(General Medicine)
Madras Medical College
Chennai 600 003

Dear Dr.D.Shobana,

The Institutional Ethics Committee has considered your request and approved your study titled **"A study on the clinical and biochemical profile of patients admitted in Toxicology ward with Rodenticide poisoning" No.06052015.**

The following members of Ethics Committee were present in the meeting held on 12.05.2015 conducted at Madras Medical College, Chennai-3.

1. Prof.C.Rajendran, M.D.,	: Chairperson
2. Prof.R.Vimala, M.D., Dean, MMC, Ch-3	: Deputy Chairperson
3. Prof.B.Kalaiselvi, M.D., Vice-Principal, MMC, Ch-3	: Member Secretary
4. Prof.B.Vasanthi, M.D., Prof. of Pharmacology, MMC	: Member
5. Prof.P.Ragumani, M.S., Professor of Surgery, MMC	: Member
6. Prof.Saraswathy, M.D., Director, Pathology, MMC, Ch-3	: Member
7. Prof.K.Srinivasagalu, M.D.,Director, I.I.M. MMC, Ch-3	: Member
8. Thiru S.Rameshkumar, B.Com., MBA	: Lay Person
9. Thiru S.Govindasamy, B.A., B.L.,	: Lawyer
10. Tmt.Arnold Saulina, M.A., MSW.,	: Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

SNO	AGE	SEX	IP NO	Content	DURATION IN	DEATH	DOSE	FEVER	VOMITING	HEMATEMESIS	MELENA	HEMATURIA	GUMBLEED	ABDOMINAL PAIN	ABDOMINAL DISTENSION	CHEST PAIN	BREATHLESNESS	SEIZURES	ALTERED SENSORIUM	HEADACHE	WEEKNESS OF LIMBS
1	20	F	59870	PASTE	6- 12 HRS	-	15 g	+	-	-	-	-	-	-	-	+	+	+	+	-	-
2	34	M	39584	POWDER	6- 12 HRS	-	10 g	-	+	-	-	-	-	+	-	-	-	-	-	-	-
3	45	F	59876	BAIT	12-24 HRS	-	30 g	-	-	+	+	+	-	-	-	-	-	-	-	-	-
4	28	M	39592	POWDER	6- 12 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
5	20	F	59882	POWDER	6- 12 HRS	-	10 g	-	+	-	-	-	+	-	-	-	-	-	-	-	-
6	54	F	39600	BAIT	24-72 HRS	-	50 g	-	-	+	+	-	-	-	-	-	-	-	-	+	-
7	34	M	59888	POWDER	6- 12 HRS	-	15 g	+	+	-	-	-	-	-	-	-	-	-	-	-	-
8	39	M	39608	POWDER	6- 12 HRS	-	10 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	53	F	59894	BAIT	12-24 HRS	-	40 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
10	20	F	39616	POWDER	6- 12 HRS	-	15 g	+	+	-	-	-	+	-	-	-	-	-	-	-	-
11	37	F	59900	POWDER	6- 12 HRS	-	10 g	-	-	-	-	-	-	+	-	+	+	+	-	+	-
12	34	F	39624	POWDER	6- 12 HRS	-	40 g	-	+	-	-	+	-	-	-	-	-	-	-	-	-
13	54	M	59906	BAIT	12-24 HRS	-	30 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
14	48	F	39632	POWDER	6- 12 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
15	20	M	59912	POWDER	0-6 HRS	-	10 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
16	24	M	39640	BAIT	12-24 HRS	-	40 g	-	+	+	+	-	+	-	-	-	-	-	-	-	-
17	22	F	59918	POWDER	0-6 HRS	-	15 g	+	+	-	-	-	-	-	-	-	-	-	-	-	-
18	34	F	39648	BAIT	24-72 HRS	-	40 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
19	35	M	59924	POWDER	0-6 HRS	-	10 g	+	+	-	-	-	-	-	-	-	-	-	-	-	-
20	20	F	39656	POWDER	0-6 HRS	-	15 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	33	F	59930	POWDER	0-6 HRS	-	10 g	-	+	-	-	-	+	-	-	-	-	-	-	-	-
22	48	F	39664	POWDER	0-6 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
23	54	F	59936	BAIT	12-24 HRS	-	30 g	+	-	+	+	-	-	-	-	-	-	-	-	-	-
24	39	F	39672	POWDER	12-24 HRS	-	10 g	-	+	-	-	-	-	+	-	-	-	-	-	-	-
25	20	M	59942	POWDER	12-24 HRS	-	55 g	-	+	-	-	+	-	-	-	-	-	-	-	+	-
26	22	F	39680	PASTE	12-24 HRS	-	15 g	-	-	-	-	-	-	-	-	+	+	+	+	-	-
27	32	F	59948	POWDER	12-24 HRS	-	10 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
28	24	M	39688	BAIT	3-7 Days	-	40 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
29	28	M	59954	POWDER	12-24 HRS	-	15 g	+	-	-	-	-	-	-	-	-	-	-	-	-	-
30	20	F	39696	POWDER	12-24 HRS	-	10 g	+	+	-	-	-	-	-	-	-	-	-	-	-	-
31	39	F	59960	POWDER	12-24 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
32	48	M	39704	BAIT	3-7 Days	-	30 g	-	+	+	+	+	-	-	-	-	-	-	-	-	-
33	54	F	59966	POWDER	12-24 HRS	-	10 g	-	-	-	-	-	+	-	-	-	-	-	-	-	-
34	26	F	39712	POWDER	12-24 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
35	50	M	59972	POWDER	12-24 HRS	-	10 g	-	+	-	-	-	-	-	-	-	-	-	-	+	-
36	34	F	39720	PASTE	6-12 HRS	DEATH	60 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
37	22	M	59966	POWDER	24-72 HRS	-	15 g	-	+	-	-	-	-	+	-	-	-	-	-	-	-
38	33	M	39728	POWDER	24-72 HRS	-	10 g	-	+	-	-	-	+	-	-	-	-	-	-	-	-
39	32	F	59984	BAIT	3-7 Days	-	40 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
40	54	F	39736	POWDER	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	+	+	+	-	-	-
41	48	F	59990	POWDER	24-72 HRS	-	15 g	-	-	-	-	-	-	-	-	-	-	-	-	-	+
42	53	F	39744	POWDER	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-

JAUNDICE	OLIGURIA	BP	HB	TC	PLATELETS	UREA	CRATININE	SODIUM	POTASIUM	CALCIUM	BILLIRUBIN	BT/CT	PT/INR	SGOT/SGPT	STOOL OCCULTBLOOD	ARRTHYMIA IN ECG	ULTRASOUND ABDOMEN	LUNG ILFILTERATION IN CHEST X-RAY	CT BRAIN
-	+	INC	14.5	12000	207000	150	4.8	120	3.4	15	0.9	2/4	12/1.2	20/35	-	-	NORMALSTUDY	-	NORMAL
-	-	-	14	8000	250000	25	0.9	136	3.7	11.5	1.1	5/6	11/0.9	35/20	-	+	NORMALSTUDY	-	-
-	-	-	6	11,500	30,000	30	0.8	138	3.4	10.5	1	**9/10**	40/4.5	20/35	+	-	NORMALSTUDY	-	-
-	-	-	13.8	9000	207000	20	0.9	136	3.8	11.5	0.9	2/4	12/1.2	15/20	-	-	NORMALSTUDY	-	-
-	-	-	12.9	9200	300000	25	1	140	3.4	11.5	1	2/6	12/0.8	35/20	-	-	NORMALSTUDY	-	-
+	-	-	13.5	11000	20,000	35	1	136	3.7	10	4.5	**12/10**	35/3	110/120	+	-	NORMALSTUDY	-	**ICH**
-	-	-	14	9000	207000	25	0.9	138	3.4	11.5	1.1	2/4	12/1.2	20/35	-	-	CHOLECYSTITIS	-	-
-	-	-	13.2	9200	207000	30	0.8	136	3.9	10.5	0.9	5/6	11/0.9	25/15	-	-	NORMALSTUDY	-	-
-	-	DEC	12	12000	30,000	20	0.9	142	3.4	11.5	1	**9/10**	40/4.5	35/20	+	-	NORMALSTUDY	-	-
-	-	-	14.5	9000	300000	25	1	136	3.8	10	0.9	2/4	12/1.2	20/35	-	+	NORMALSTUDY	+	-
-	-	-	14	9200	207000	40	0.9	148	3.4	10	1	2/6	10/1	15/20	-	-	NORMALSTUDY	-	NORMAL
-	-	-	13.8	9000	250000	30	0.9	138	3.7	11.5	0.9	2/6	12/1.2	20/35	-	-	NORMALSTUDY	-	-
-	-	-	8	11,500	60,000	25	0.8	136	3.4	10.5	1.1	**15/12**	50/5	28/30	+	-	NORMALSTUDY	-	-
-	-	-	12.9	9200	207000	29	0.9	140	4	11.5	0.9	2/4	11/0.9	20/35	-	-	NORMALSTUDY	-	-
-	-	-	14	8500	300000	25	1	136	3.4	10	1	5/6	12/1.2	20/35	-	-	NORMALSTUDY	-	-
-	-	-	13.9	11,500	30,000	20	0.9	145	4.2	11.5	0.9	**16/12**	35/3	35/20	+	-	NORMALSTUDY	-	-
-	-	-	14.5	9000	207000	25	0.8	136	3.4	10.5	1.1	2/4	12/0.8	15/20	-	+	NORMALSTUDY	-	-
+	-	DEC	7.2	12000	90,000	30	0.9	138	3.8	11.5	5.5	**12/10**	40/4.5	90/85	+	-	NORMALSTUDY	-	-
-	-	-	14	8500	300000	29	1	136	3.4	10.4	0.9	3/5	12/1.2	35/20	-	-	NORMALSTUDY	-	-
-	-	-	13.8	9000	207000	25	0.9	140	3.7	11.5	1	2/6	11/0.9	35/20	-	-	**FATTY LIVER**	+	-
-	-	-	12.9	9000	250000	30	0.9	136	3.4	10.5	0.9	2/4	12/1.2	20/35	-	-	NORMALSTUDY	-	-
-	-	-	14	9000	207000	25	0.8	138	3.9	11.5	1.1	5/6	10/1	25/15	-	+	CHOLECYSTITIS	-	-
-	-	-	13.5	12000	30,000	20	1	136	3.4	9.5	0.9	**9/10**	50/5	20/35	+	-	NORMALSTUDY	-	-
-	-	-	14.5	8500	300000	30	0.9	142	3.8	11.5	1.1	2/4	12/1.2	35/20	-	-	NORMALSTUDY	-	-
-	-	-	14.2	8500	207000	25	0.8	136	3.4	10.5	0.9	3/5	11/0.9	15/20	-	-	NORMALSTUDY	-	-
-	+	-	13.8	11,500	300000	110	5	110	3.7	10.2	1	2/4	12/1.2	20/35	-	-	NORMALSTUDY	-	NORMAL
-	-	-	14	9200	207000	35	0.9	138	3.4	11.5	0.9	2/6	12/0.8	28/30	-	-	NORMALSTUDY	+	-
-	-	-	12.5	12000	20,000	25	1	136	4	10	1.1	**20/15**	40/4.5	35/20	+	-	NORMALSTUDY	-	**NORMAL**
-	-	-	12.9	8500	300000	30	0.9	138	3.9	11.5	0.9	2/4	12/1.2	15/20	-	-	NORMALSTUDY	-	-
-	-	-	14.5	9000	207000	25	0.8	136	3.7	10.5	1	5/6	11/0.9	20/35	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11000	250000	20	0.9	138	3.8	11.5	0.9	2/4	12/1.2	35/20	-	+	**FATTY LIVER**	-	-
-	-	-	7	12000	30,000	25	1	136	3.4	10	1.1	**15/12**	50/5	25/15	+	-	NORMALSTUDY	-	-
-	-	-	14.5	11,500	207000	25	0.8	140	4.4	11.5	1	3/5	10/1	35/20	-	-	NORMALSTUDY	-	-
-	-	-	14	11000	300000	30	1	136	3.7	10.5	0.9	2/4	12/1.2	15/20	-	-	NORMALSTUDY	+	-
-	-	-	13.8	11,500	207000	25	0.8	145	3.4	11.5	1.1	2/6	12/0.8	20/35	-	-	NORMALSTUDY	-	-
+	-	-	12.9	12000	200700	29	1	136	3.8	10	4.5	2/4	12/1.2	110/120	+	-	NORMALSTUDY	-	-
-	-	-	13.9	11000	300000	25	0.8	140	3.4	11.5	0.9	5/6	11/0.9	35/20	-	-	NORMALSTUDY	-	-
-	-	-	14.5	11,500	207000	30	0.9	136	4	10.5	1	2/4	12/1.2	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.5	12000	30,000	20	1	138	3.7	9.5	1.1	**9/10**	40/4.5	35/20	+	-	NORMALSTUDY	-	-
-	-	INC	13.8	11000	250000	35	0.8	150	3.4	15.5	0.9	3/5	10/1	15/20	-	-	NORMALSTUDY	-	NORMAL
-	-	-	12.9	2000	207000	30	1	136	2	11.5	1	2/4	12/1.2	20/35	-	-	NORMALSTUDY	-	-
-	-	-	14.5	12000	300000	35	0.9	142	3.7	10.5	0.9	2/6	11/0.9	35/20	-	+	CHOLECYSTITIS	-	-

43	39	M	59996	**BAIT**	**3-7 Days**	-	**30 g**	+	-	+	+	+	-	-	-	-	-	-	-	-	-
44	35	M	39752	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	+	-	-	-	-	-	-	-	-
45	34	F	60002	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
46	53	M	39760	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	-	+	-	-	-	-	-	-	-
47	48	M	60008	**PASTE**	**6-12 HRS**	**DEATH**	**80 g**	-	-	+	+	-	-	-	-	-	-	-	-	-	-
48	25	F	39768	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
49	37	M	60014	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
50	39	F	39776	POWDER	24-72 HRS	-	**40 g**	-	+	-	-	+	-	-	-	-	-	-	-	+	-
51	54	F	60020	**BAIT**	**3-7 Days**	**DEATH**	**90 g**	-	-	+	+	-	-	-	-	-	-	-	-	-	-
52	28	M	39784	POWDER	24-72 HRS	-	**5 g**	+	+	-	-	-	-	-	-	-	-	-	-	-	-
53	34	F	60026	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	+	-	+	+	+	-	-	-
54	53	M	39792	**PASTE**	**6-12 HRS**	**DEATH**	**60 g**	-	-	+	+	-	+	-	-	-	-	-	-	-	-
55	39	M	60032	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
56	62	F	39800	POWDER	24-72 HRS	-	**55 g**	-	+	-	-	+	-	-	-	-	-	-	-	-	-
57	29	F	60038	POWDER	24-72 HRS	-	**15 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58	24	M	39808	**BAIT**	**7-14 Days**	-	**40 g**	-	+	+	+	-	-	+	-	-	-	-	-	-	-
59	39	F	60044	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
60	62	F	39816	POWDER	24-72 HRS	-	**5 g**	-	-	-	-	-	-	+	-	-	-	-	-	-	-
61	28	M	60050	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
62	54	F	39824	**BAIT**	**7-14 Days**	-	**30 g**	-	+	+	+	-	-	-	-	-	-	-	-	-	-
63	48	F	60056	POWDER	24-72 HRS	-	**40 g**	-	+	-	-	+	-	-	-	-	-	-	-	-	-
64	53	M	39832	POWDER	24-72 HRS	-	**15 g**	-	-	-	-	-	-	+	-	-	-	-	-	-	-
65	26	F	60062	**BAIT**	**7-14 Days**	-	**40 g**	-	+	+	+	-	+	-	-	-	-	-	-	-	-
66	37	M	39840	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	-	-	-	+	+	+	-	-	-
67	22	M	60068	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
68	48	F	39848	POWDER	24-72 HRS	-	**5 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69	54	M	60074	**BAIT**	**7-14 Days**	-	**30 g**	-	+	+	+	-	-	-	-	-	-	-	-	-	-
70	67	M	39856	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	+	-	-	-	-	-	-	-
71	62	F	60080	POWDER	24-72 HRS	-	**5 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72	28	M	39864	PASTE	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	+	+	+	+	-	-
73	31	F	60086	**BAIT**	**7-14 Days**	-	**40 g**	-	-	+	+	-	-	-	-	-	-	-	-	-	-
74	33	F	39872	POWDER	24-72 HRS	-	**5 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75	37	M	60092	POWDER	24-72 HRS	-	**55 g**	-	+	-	-	+	-	+	-	-	-	-	-	-	-
76	50	M	39880	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	+	-	-	-	-	-	-	-	-
77	48	F	60098	**PASTE**	**6-12 HRS**	**DEATH**	**80 g**	-	+	+	+	-	-	-	-	-	-	-	-	-	-
78	29	F	39888	POWDER	24-72 HRS	-	**15 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	+
79	31	M	60104	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
80	35	F	39896	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	+	+	+	-	-	-
81	28	M	60110	POWDER	24-72 HRS	-	**5 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	62	M	39904	**BAIT**	**24-72 HRS**	-	**30 g**	-	-	+	+	-	-	-	-	-	-	-	-	-	-
83	22	F	60116	POWDER	24-72 HRS	-	**5 g**	-	+	-	-	-	-	+	-	-	-	-	-	-	-
84	53	M	39912	POWDER	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
85	67	M	60122	PASTE	24-72 HRS	-	**5 g**	-	+	-	-	-	-	-	-	+	+	+	+	-	-
86	32	F	39920	**BAIT**	**24-72 HRS**	**DEATH**	**80 g**	-	+	+	+	-	-	-	-	-	-	-	-	-	-
87	33	F	60128	POWDER	24-72 HRS	-	**15 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-

-	-	DEC	8.3	11,500	200700	30	0.8	136	3.9	10	1.1	5/6	12/1.2	25/15	+	-	NORMALSTUDY	-	-
-	-	-	13.1	11000	207000	25	1	138	3.4	11.5	1	2/4	12/0.8	35/20	-	-	NORMALSTUDY	-	-
-	-	-	13.8	12000	300000	30	1	136	3.7	10.5	1.1	3/5	10/1	20/35	-	-	NORMALSTUDY	-	-
-	-	-	14.5	11,500	207000	20	0.9	140	3.4	11.5	0.9	2/6	11/0.9	15/20	-	-	NORMALSTUDY	-	-
+	-	-	5	12000	30,000	25	0.8	136	4.2	10.4	4.9	**12/10**	35/3	90/85	+	-	NORMALSTUDY	-	-
-	-	-	12.9	11000	300000	30	1	145	3.8	11.5	1	2/4	12/1.2	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.8	12000	207000	30	0.9	136	3.7	10.5	1.1	5/6	12/0.8	35/20	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	300000	25	1	140	3.9	11.5	0.9	2/4	11/0.9	20/35	-	+	**FATTY LIVER**	+	-
-	-	-	13.5	12000	20,000	30	0.8	136	4	10	1.1	**15/10**	40/4.5	15/20	+	-	NORMALSTUDY	-	**ICH**
-	-	-	14.5	11000	207000	29	0.9	138	3.8	11.5	1.1	3/5	10/1	35/20	-	-	NORMALSTUDY	-	-
-	-	-	13.8	12000	300000	25	0.9	155	3.7	10.4	0.9	2/6	12/1.2	25/15	-	-	NORMALSTUDY	-	NORMAL
+	-	-	12.9	11,500	30,000	25	1	136	4.4	10.5	5.5	**9/10**	50/5	120/100	+	-	NORMALSTUDY	-	-
-	-	-	14.5	12000	207000	20	0.9	142	3.9	11.5	1	2/4	11/0.9	20/35	-	-	NORMALSTUDY	-	-
-	-	-	13.9	12000	207000	29	1	145	3.7	10	1	5/6	12/0.8	35/20	-	-	NORMALSTUDY	-	-
-	-	-	13.8	12000	250000	25	0.8	136	3.8	11.5	0.9	2/4	12/1.2	15/20	-	-	NORMALSTUDY	-	-
-	-	-	7.5	11000	60,000	25	0.9	138	4	10.5	1	**20/15**	40/4.5	20/35	+	-	NORMALSTUDY	-	-
-	-	-	12.9	12000	207000	30	1	140	3.7	11.5	0.9	3/5	10/1	35/20	-	+	NORMALSTUDY	-	-
-	-	-	13.2	12000	300000	25	0.9	136	4.2	9.5	0.9	2/4	11/0.9	20/35	-	-	NORMALSTUDY	-	-
-	-	-	14.5	11,500	207000	35	1	138	3.8	11.5	1.1	5/6	12/1.2	35/20	-	-	NORMALSTUDY	-	-
-	-	-	12.5	11000	30,000	20	0.9	136	3.7	10.5	0.9	**12/10**	50/5	20/35	+	-	NORMALSTUDY	-	-
-	-	-	12.6	12000	300000	25	0.8	142	3.9	10	0.9	2/4	12/0.8	28/30	-	-	**FATTY LIVER**	-	-
-	-	-	12.9	12000	207000	29	1	136	4	10.5	1	2/6	12/1.2	20/35	-	-	NORMALSTUDY	-	-
-	-	DEC	14	11000	90,000	25	0.9	145	3.7	11.5	1.1	**15/12**	40/4.5	35/20	+	-	NORMALSTUDY	-	-
-	+	-	14.5	11,500	300000	95	3.8	152	3.8	11	0.9	2/4	10/1	20/35	-	-	NORMALSTUDY	-	NORMAL
-	-	-	13.9	11000	300000	20	1	136	3.6	10	1.1	5/6	12/1.2	25/15	-	-	NORMALSTUDY	-	-
-	-	-	12.9	12000	207000	25	0.9	138	3.7	10.4	1	2/4	11/0.9	20/35	-	-	NORMALSTUDY	-	-
-	-	-	6	11,500	30,000	30	0.8	140	3.8	11.5	1.1	**16/12**	35/3	35/20	+	-	NORMALSTUDY	-	-
-	-	-	14.2	12000	250000	25	0.9	142	3.8	10.5	0.9	3/5	12/1.2	20/35	-	-	NORMALSTUDY	-	-
-	-	-	14.5	11000	300000	29	1	138	3.7	10	1	2/4	10/1	15/20	-	-	NORMALSTUDY	-	-
-	-	INC	13.2	12000	207000	23	0.8	120	3.9	17	0.9	5/6	12/1.2	20/35	-	-	NORMALSTUDY	-	NORMAL
-	-	-	12.5	12000	20,000	25	0.9	140	3.7	10	1.1	**15/10**	40/4.5	35/20	+	-	NORMALSTUDY	-	**NORMAL**
-	-	-	12.9	12000	300000	20	0.8	145	4	10.5	1	2/6	11/0.9	28/30	-	-	NORMALSTUDY	-	-
-	-	-	14.5	11,500	207000	25	1	138	3.8	9.5	0.9	2/4	12/0.8	20/35	-	-	NORMALSTUDY	-	-
-	-	-	13.9	11000	300000	35	1	142	3.7	10.5	1	5/6	12/1.2	35/20	-	-	NORMALSTUDY	-	-
+	-	-	12.9	12000	200700	25	0.9	140	4	10	4.5	2/4	11/0.9	110/120	+	-	NORMALSTUDY	-	-
-	-	-	14.5	3000	207000	30	0.8	142	2.3	10	0.9	2/6	12/1.2	20/35	-	-	NORMALSTUDY	-	-
-	-	-	14.4	12000	300000	25	1	138	3.8	10.5	1.1	5/6	10/1	35/20	-	-	NORMALSTUDY	-	-
-	+	-	14.5	12000	207000	140	5	149	3.9	11.5	0.9	2/4	11/0.9	20/35	-	-	NORMALSTUDY	-	NORMAL
-	-	-	14.2	12000	300000	20	0.9	140	4.2	9.5	1	3/5	12/1.2	15/20	-	-	NORMALSTUDY	-	-
-	-	-	8	11000	200700	25	0.8	142	4	10.5	0.9	2/4	12/0.8	20/35	+	-	NORMALSTUDY	-	-
-	-	-	13.1	11,500	207000	29	0.9	138	3.9	10	1.1	5/6	12/1.2	25/15	-	-	NORMALSTUDY	-	-
-	-	-	14.5	12000	300000	25	1	140	4.4	10.5	0.9	2/6	11/0.9	20/35	-	-	NORMALSTUDY	-	-
-	-	INC	12.9	11000	207000	32	0.7	115	3.8	10	1	2/4	12/1.2	15/20	-	-	NORMALSTUDY	-	NORMAL
-	-	-	6.5	11000	20,000	30	0.9	138	3.9	10	0.9	**12/10**	50/5	35/20	+	-	NORMALSTUDY	-	**ICH**
-	-	-	13.9	12000	300000	25	0.9	145	4	10.5	1.1	5/6	10/1	20/35	-	-	NORMALSTUDY	-	-

88	53	M	39928	POWDER	24-72 HRS	-	5 g	-	-	-	-	-	-	+	-	-	-	-	-	-	-
89	26	F	60134	POWDER	24-72 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
90	25	M	39936	BAIT	24-72 HRS	-	40 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
91	62	F	60140	POWDER	24-72 HRS	-	40 g	-	-	-	-	+	-	-	-	-	-	-	-	-	-
92	26	M	39944	POWDER	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
93	29	F	60146	BAIT	24-72 HRS	-	30 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
94	37	M	39952	POWDER	24-72 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
95	67	F	60152	POWDER	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
96	28	M	39960	PASTE	6-12 HRS	DEATH	70 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
97	22	F	60158	POWDER	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98	29	M	39968	POWDER	24-72 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
99	24	F	60164	BAIT	24-72 HRS	-	40 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
100	37	F	39976	POWDER	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	+	+	+	+	-	-
101	50	M	60170	POWDER	24-72 HRS	-	15 g	-	-	-	-	-	-	+	-	-	-	-	-	-	-
102	31	F	39984	BAIT	24-72 HRS	-	30 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
103	62	M	60176	POWDER	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	+
104	33	F	39992	POWDER	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	35	F	60182	PASTE	6-12 HRS	DEATH	60 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
106	45	F	40000	BAIT	24-72 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
107	67	M	60188	BAIT	24-72 HRS	-	40 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
108	31	F	40008	PASTE	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
109	29	F	60194	BAIT	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
110	28	M	40016	PASTE	24-72 HRS	-	15 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
111	50	M	60200	POWDER	24-72 HRS	-	30 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
112	37	F	40024	POWDER	24-72 HRS	-	40 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
113	26	F	60206	BAIT	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
114	29	M	40032	POWDER	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	+
115	37	F	60212	PASTE	24-72 HRS	-	15 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
116	45	F	40040	BAIT	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
117	67	M	60218	PASTE	24-72 HRS	-	30 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
118	62	M	40048	POWDER	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
119	32	F	60224	PASTE	24-72 HRS	-	15 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120	22	M	40056	BAIT	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
121	62	F	60230	PASTE	6-12 HRS	DEATH	70 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
122	24	F	40064	PASTE	24-72 HRS	-	40 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
123	45	M	60236	PASTE	24-72 HRS	-	15 g	-	+	-	-	-	-	+	-	-	-	-	-	-	-
124	25	F	40072	BAIT	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125	29	M	60242	PASTE	24-72 HRS	-	15 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
126	31	M	40080	PASTE	24-72 HRS	-	30 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
127	26	F	60248	BAIT	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-
128	29	M	40088	PASTE	24-72 HRS	-	40 g	-	-	+	+	-	-	-	-	-	-	-	-	-	-
129	24	F	60254	PASTE	24-72 HRS	-	30 g	-	+	+	+	-	-	-	-	-	-	-	-	-	-
130	45	M	40096	POWDER	24-72 HRS	-	15 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
131	32	F	60260	POWDER	24-72 HRS	-	5 g	-	-	-	-	-	-	-	-	-	-	-	-	-	+
132	67	M	40104	PASTE	24-72 HRS	-	5 g	-	+	-	-	-	-	-	-	-	-	-	-	-	-

-	-	-	14.5	11,500	207000	35	1	138	3.9	10.4	0.9	3/5	11/0.9	28/30	-	-	NORMALSTUDY	-	-
-	-	-	12.9	11,500	250000	25	0.8	138	3.8	10.5	1	5/6	12/0.8	15/20	-	-	NORMALSTUDY	-	-
-	-	DEC	13.5	11000	90,000	20	0.9	142	4.2	10	0.9	**20/15**	40/4.5	25/15	+	-	NORMALSTUDY	-	-
-	-	-	12.6	12000	300000	25	1	138	3.9	10.5	1.1	2/6	11/0.9	15/20	-	-	NORMALSTUDY	-	-
-	-	-	14.5	12000	207000	30	0.9	138	3.8	10	0.9	5/6	10/1	28/30	-	-	NORMALSTUDY	-	-
-	-	-	8.5	11,500	200700	25	0.8	140	4	10.5	1	2/6	11/0.9	35/20	+	-	NORMALSTUDY	-	-
-	-	-	12.9	11000	300000	29	1	145	3.8	9.5	0.9	5/6	12/0.8	15/20	-	-	NORMALSTUDY	-	-
-	-	-	13.2	12000	207000	20	1	138	4	10.5	1.1	3/5	10/1	35/20	-	-	NORMALSTUDY	-	-
+	-	-	12.9	11,500	60,000	25	0.9	142	3.8	9.5	6	**15/12**	35/3	90/85	+	-	NORMALSTUDY	-	-
-	-	-	14.2	12000	300000	35	0.8	138	3.9	10.5	0.9	5/6	11/0.9	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.9	11000	207000	25	0.9	140	4.4	10	1	2/6	12/0.8	35/20	-	-	NORMALSTUDY	-	-
-	-	-	7.5	12000	90,000	20	1	142	3.9	10.4	0.9	**15/10**	35/3	15/20	+	-	NORMALSTUDY	-	-
-	+	INC	14.4	11,500	300000	120	5.5	100	4	10.5	1.1	5/6	11/0.9	28/30	-	-	NORMALSTUDY	-	NORMAL
-	-	-	12.9	12000	300000	25	0.9	145	4.2	10.5	1	3/5	10/1	35/20	-	-	NORMALSTUDY	-	-
-	-	-	5.5	11000	200700	29	0.9	138	3.9	10	0.9	2/6	11/0.9	15/20	+	-	NORMALSTUDY	-	-
-	-	-	12.6	2300	207000	25	1	140	2.2	10.5	1.1	5/6	12/0.8	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.9	12000	250000	20	0.8	142	4.4	9.5	0.9	3/5	11/0.9	15/20	-	-	NORMALSTUDY	-	-
+	-	-	14	11,500	90,000	25	0.8	138	3.9	10.5	4.5	**16/12**	50/5	120/100	+	-	NORMALSTUDY	-	-
-	-	-	14.2	11000	207000	35	0.9	142	4	10	1	5/6	10/1	35/20	-	-	NORMALSTUDY	-	-
-	-	-	12.5	12000	90,000	25	1	142	3.9	10.5	0.9	**15/10**	50/5	25/15	+	-	NORMALSTUDY	-	-
-	-	-	12.9	11,500	300000	29	0.8	138	4.2	10.4	1.1	2/6	11/0.9	15/20	-	-	NORMALSTUDY	-	-
-	-	-	13.1	11000	207000	20	1	140	3.9	10.5	0.9	5/6	12/0.8	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.2	12000	300000	25	0.9	145	3.9	10	1	3/5	11/0.9	15/20	-	-	NORMALSTUDY	-	-
-	-	-	12.9	11000	200700	29	1	138	4	10.5	0.9	5/6	10/1	28/30	+	-	NORMALSTUDY	-	-
-	-	-	6.5	12000	60,000	35	0.8	142	4.4	9.5	1.1	**20/15**	35/3	15/20	+	-	NORMALSTUDY	-	-
-	-	-	13.9	11,500	300000	25	0.8	140	4	10.5	0.9	3/5	11/0.9	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.2	3000	207000	20	0.8	138	2.7	9.5	1	5/6	12/0.8	15/20	-	-	NORMALSTUDY	-	-
-	-	-	12.6	12000	300000	25	0.8	142	4.2	10.5	0.9	3/5	11/0.9	25/15	-	-	NORMALSTUDY	-	-
-	-	-	12.9	11,500	207000	25	1	140	4	10	1.1	5/6	10/1	15/20	-	-	NORMALSTUDY	-	-
-	-	-	14	11000	90,000	29	0.8	145	4.4	10.5	0.9	**16/12**	50/5	25/15	+	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	300000	25	0.8	140	4	9.5	1	2/6	11/0.9	15/20	-	-	NORMALSTUDY	-	-
-	-	-	14.2	11000	250000	35	1	142	4	10.5	0.9	5/6	12/0.8	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.9	11,500	300000	25	0.8	142	4.2	10	1.1	3/5	11/0.9	15/20	-	-	NORMALSTUDY	-	-
+	-	-	13.5	11000	200700	20	1	140	4.4	10.5	6	2/6	10/1	90/85	+	-	NORMALSTUDY	-	-
-	-	-	14.4	11,500	90,000	25	0.8	142	4.2	10.4	1	**15/12**	35/3	25/15	+	-	NORMALSTUDY	-	-
-	-	-	12.6	11000	207000	29	1	140	4.4	10.5	1.1	3/5	12/0.8	15/20	-	-	NORMALSTUDY	-	-
-	-	-	13.9	11,500	300000	29	0.8	142	4.2	9.5	1	5/6	10/1	25/15	-	-	NORMALSTUDY	-	-
-	-	-	14.4	11000	300000	20	0.8	140	4	10	1.1	2/6	12/0.8	15/20	-	-	NORMALSTUDY	-	-
-	-	-	9	11000	90,000	35	1	145	4.2	10.4	1	**15/10**	35/3	25/15	+	-	NORMALSTUDY	-	-
-	-	-	14.2	11,500	207000	29	0.8	140	4.4	10	1.1	3/5	10/1	15/20	-	-	NORMALSTUDY	-	-
-	-	-	14	11000	60,000	35	0.8	145	4.2	9.5	1	**20/15**	50/5	28/30	+	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	200700	29	0.8	140	4.4	10.4	1.1	5/6	12/0.8	15/20	+	-	NORMALSTUDY	-	-
-	-	-	13.9	11000	300000	35	1	142	3.6	10	1	2/6	10/1	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.1	2,900	207000	29	0.8	140	2.1	9.5	1.1	3/5	12/0.8	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11000	300000	29	0.8	145	4.4	10.4	1	2/6	10/1	25/15	-	-	NORMALSTUDY	-	-

133	35	F	60266	BAIT	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
134	24	F	40112	BAIT	24-72 HRS	-	**20 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135	50	M	60272	PASTE	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
136	31	F	40120	**PASTE**	**6-12 HRS**	**DEATH**	**60 g**	-	+	+	+	-	-	-	-	-	-	-	-	-	-
137	45	M	60278	BAIT	24-72 HRS	-	**20 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
138	35	F	40128	PASTE	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
139	33	M	60284	PASTE	24-72 HRS	-	**20 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
140	32	F	40136	BAIT	24-72 HRS	-	**15 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
141	67	F	60290	PASTE	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
142	26	M	40144	BAIT	24-72 HRS	-	**20 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
143	24	F	60296	**PASTE**	**24-72 HRS**	-	**40 g**	-	-	+	+	-	-	-	-	-	-	-	-	-	-
144	25	M	40152	BAIT	24-72 HRS	-	**15 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
145	45	F	60302	PASTE	24-72 HRS	-	**20 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
146	50	F	40160	BAIT	24-72 HRS	-	**20 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
147	35	F	60308	PASTE	24-72 HRS	-	**15 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
148	33	F	40168	PASTE	24-72 HRS	-	**20 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
149	32	M	60314	BAIT	24-72 HRS	-	**20 g**	-	+	-	-	-	-	-	-	-	-	-	-	-	-
150	67	F	40176	BAIT	24-72 HRS	-	**15 g**	-	-	-	-	-	-	-	-	-	-	-	-	-	-

-	-	-	12.6	11,500	207000	35	0.8	142	3.6	10	1.1	3/5	12/0.8	25/15	-	-	CHOLECYSTITIS	-	-
-	-	-	13.9	11000	300000	29	1	145	4.4	9.5	1.1	3/5	10/1	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	207000	29	0.8	140	4.4	9.5	1	2/6	12/0.8	28/30	-	-	NORMALSTUDY	-	-
+	-	-	13.5	11000	90,000	35	0.8	142	4.2	10	4.5	**16/12**	35/3	90/85	+	-	NORMALSTUDY	-	-
-	-	-	14.2	11,500	300000	29	1	140	4.4	9.5	1	3/5	10/1	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.1	11000	207000	35	0.8	142	4.4	9.5	1	2/6	12/0.8	25/15	-	+	**FATTY LIVER**	-	-
-	-	-	13.2	11,500	300000	29	1	140	4.2	9.5	1	3/5	10/1	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.9	11000	207000	35	0.8	142	4.4	9.5	1	2/6	12/0.8	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	300000	29	1	140	4.2	9.5	1	3/5	10/1	25/15	-	-	NORMALSTUDY	-	-
-	-	-	12.6	11000	207000	35	1	142	3.6	9.5	1.1	2/6	12/0.8	25/15	-	-	NORMALSTUDY	-	-
-	-	-	14	11,500	200700	29	0.8	145	4.4	9.5	1	3/5	10/1	28/30	+	-	NORMALSTUDY	-	-
-	-	-	13.2	11000	300000	35	1	145	3.6	9.5	1	2/6	12/0.8	25/15	-	-	NORMALSTUDY	-	-
-	-	-	14.2	11,500	207000	29	0.8	142	4.2	9.5	1	3/5	10/1	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	300000	29	0.8	145	4.4	9.5	1.1	2/6	12/0.8	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.1	11,500	300000	29	1	142	4.2	9.5	1	3/5	10/1	28/30	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	300000	35	0.8	145	4.2	9.5	1	2/6	12/0.8	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.9	11,500	300000	29	1	145	4.2	9.5	1	3/5	10/1	25/15	-	-	NORMALSTUDY	-	-
-	-	-	13.2	11,500	300000	29	0.8	142	4.4	9.5	1	3/5	12/0.8	28/30	-	+	CHOLECYSTITIS	-	-

S NO	AGE	SEX	IP NO	Content	DURATION	DEATH	DOSE	HEMATE MESIS	MELENA	JAUNDICE	BILLIRUBIN	PT/INR	DURATION	HEMATE MESIS	MELENA	JAUNDICE	BILLIRUBI	PT/INR
1	45	F	59876	**BAIT**	**12-24 HRS**	**-**	**30 g**	**+**	**+**	**-**	1	40/4.5	4 DAYS	**-**	**-**	**-**	1	11/1.2
2	54	F	39600	**BAIT**	**24-72 HRS**	**-**	**50 g**	**+**	**+**	**+**	4.5	35/3	5 DAYS	**-**	**-**	**-**	1	15/1.5
3	53	F	59894	**BAIT**	**12-24 HRS**	**-**	**40 g**	**+**	**+**	**-**	1	40/4.5	4 DAYS	**-**	**-**	**-**	1.1	13/1
4	54	M	59906	**BAIT**	**12-24 HRS**	**-**	**30 g**	**+**	**+**	**-**	1.1	50/5	4 DAYS	**-**	**-**	**-**	0.9	15/1.3
5	24	M	39640	**BAIT**	**12-24 HRS**	**-**	**40 g**	**+**	**+**	**-**	0.9	35/3	4 DAYS	**-**	**-**	**-**	0.9	16/1.2
6	34	F	39648	**BAIT**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**+**	5.5	40/4.5	5 DAYS	**-**	**-**	**-**	1.2	12/1.5
7	54	F	59936	**BAIT**	**12-24 HRS**	**-**	**30 g**	**+**	**+**	**-**	0.9	50/5	4 DAYS	**-**	**-**	**-**	0.9	14/1.4
8	24	M	39688	**BAIT**	**3-7 Days**	**-**	**40 g**	**+**	**+**	**-**	1.1	40/4.5	9 DAYS	**-**	**-**	**-**	0.8	13/1.5
9	48	M	39704	**BAIT**	**3-7 Days**	**-**	**30 g**	**+**	**+**	**-**	1.1	50/5	9 DAYS	**-**	**-**	**-**	0.8	14/1
10	34	F	39720	**PASTE**	**6-12 HRS**	**DEATH**	**60 g**	**+**	**+**	**+**	4.5	12/1.2	**-**	**-**	**-**	**-**	**-**	**-**
11	32	F	59984	**BAIT**	**3-7 Days**	**-**	**40 g**	**+**	**+**	**-**	1.1	40/4.5	9 DAYS	**-**	**-**	**-**	0.8	15/1.5
12	39	M	59996	**BAIT**	**3-7 Days**	**-**	**30 g**	**+**	**+**	**-**	1.1	12/1.2	9 DAYS	**-**	**-**	**-**	0.7	16/0.8
13	48	M	60008	**PASTE**	**6-12 HRS**	**DEATH**	**80 g**	**+**	**+**	**+**	4.9	35/3	**-**	**-**	**-**	**-**	**-**	**-**
14	54	F	60020	**BAIT**	**3-7 Days**	**DEATH**	**90 g**	**+**	**+**	**-**	1.1	40/4.5	**-**	**-**	**-**	**-**	**-**	**-**
15	53	M	39792	**PASTE**	**6-12 HRS**	**DEATH**	**60 g**	**+**	**+**	**+**	5.5	50/5	**-**	**-**	**-**	**-**	**-**	**-**
16	24	M	39808	**BAIT**	**7-14 Days**	**-**	**40 g**	**+**	**+**	**-**	1	40/4.5	15 Days	**-**	**-**	**-**	1	12/1
17	54	F	39824	**BAIT**	**7-14 Days**	**-**	**30 g**	**+**	**+**	**-**	0.9	50/5	15 Days	**-**	**-**	**-**	1.7	13/1.5
18	26	F	60062	**BAIT**	**7-14 Days**	**-**	**40 g**	**+**	**+**	**-**	1.1	40/4.5	15 Days	**-**	**-**	**-**	1.2	13/0.8
19	54	M	60074	**BAIT**	**7-14 Days**	**-**	**30 g**	**+**	**+**	**-**	1.1	35/3	15 Days	**-**	**-**	**-**	0.8	14/0.9
20	31	F	60086	**BAIT**	**7-14 Days**	**-**	**40 g**	**+**	**+**	**-**	1.1	40/4.5	15 Days	**-**	**-**	**-**	0.9	15/1.5
21	48	F	60098	**PASTE**	**6-12 HRS**	**DEATH**	**80 g**	**+**	**+**	**+**	4.5	11/0.9	**-**	**-**	**-**	**-**	**-**	**-**
22	62	M	39904	**BAIT**	**24-72 HRS**	**-**	**30 g**	**+**	**+**	**-**	0.9	12/0.8	5 DAYS	**-**	**-**	**-**	1	13/1
23	32	F	39920	**BAIT**	**24-72 HRS**	**DEATH**	**80 g**	**+**	**+**	**-**	0.9	50/5	**-**	**-**	**-**	**-**	**-**	**-**
24	25	M	39936	**BAIT**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**-**	0.9	40/4.5	5 DAYS	**-**	**-**	**-**	0.9	15/1.2
25	29	F	60146	**BAIT**	**24-72 HRS**	**-**	**30 g**	**+**	**+**	**-**	1	11/0.9	5 DAYS	**-**	**-**	**-**	0.7	16/1.2
26	28	M	39960	**PASTE**	**6-12 HRS**	**DEATH**	**70 g**	**+**	**+**	**+**	6	35/3	**-**	**-**	**-**	**-**	**-**	**-**
27	24	F	60164	**BAIT**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**-**	0.9	35/3	5 DAYS	**-**	**-**	**-**	1.1	16/1

28	31	F	39984	**BAIT**	**24-72 HRS**	**-**	**30 g**	**+**	**+**	**-**	0.9	11/0.9	5 DAYS	**-**	**-**	**-**	1.2	16/1.3
29	35	F	60182	**PASTE**	**6-12 HRS**	**DEATH**	**60 g**	**+**	**+**	**+**	4.5	50/5	**-**	**-**	**-**	**-**	**-**	**-**
30	67	M	60188	**BAIT**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**-**	0.9	50/5	5 DAYS	**-**	**-**	**-**	1.3	15/1.8
31	50	M	60200	**POWDER**	**24-72 HRS**	**-**	**30 g**	**+**	**+**	**-**	0.9	10/1	5 DAYS	**-**	**-**	**-**	0.8	13/1
32	37	F	40024	**POWDER**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**-**	1.1	35/3	5 DAYS	**-**	**-**	**-**	0.9	15/1.4
33	67	M	60218	**PASTE**	**24-72 HRS**	**-**	**30 g**	**+**	**+**	**-**	0.9	50/5	5 DAYS	**-**	**-**	**-**	0.7	15/1.3
34	62	F	60230	**PASTE**	**6-12 HRS**	**DEATH**	**70 g**	**+**	**+**	**+**	6	10/1	**-**	**-**	**-**	**-**	**-**	**-**
35	24	F	40064	**PASTE**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**-**	1	35/3	5 DAYS	**-**	**-**	**-**	0.6	17/1.3
36	31	M	40080	**PASTE**	**24-72 HRS**	**-**	**30 g**	**+**	**+**	**-**	1	35/3	5 DAYS	**-**	**-**	**-**	1.1	12/1.3
37	29	M	40088	**PASTE**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**-**	1	50/5	5 DAYS	**-**	**-**	**-**	1.1	11/1
38	24	F	60254	**PASTE**	**24-72 HRS**	**-**	**30 g**	**+**	**+**	**-**	1.1	12/0.8	5 DAYS	**-**	**-**	**-**	1.2	14/1.6
39	31	F	40120	**PASTE**	**6-12 HRS**	**DEATH**	**60 g**	**+**	**+**	**+**	4.5	35/3	**-**	**-**	**-**	**-**	**-**	**-**
40	24	F	60296	**PASTE**	**24-72 HRS**	**-**	**40 g**	**+**	**+**	**-**	1	10/1	5 DAYS	**-**	**-**	**-**	1	15/1.4

SNO	AGE	SEX	IP NO	Content	DURATION IN	DOSE	WEEKNESS OF LIMBS	SODIUM	POTASIUM	DURATION IN	WEEKNESS OF LIMBS	SODIUM	POTASIUM
1	20	F	59870	PASTE	6- 12 HRS	**15 g**	-	120	3.4	5 DAYS	-	134	3.6
26	22	F	39680	PASTE	12-24 HRS	**15 g**	-	110	3.7	5 DAYS	-	135	3.7
41	48	F	59990	POWDER	24-72 HRS	**15 g**	+	136	2	5 DAYS	-	136	3.9
72	28	M	39864	PASTE	24-72 HRS	**15 g**	-	120	3.9	5 DAYS	-	140	4.2
78	29	F	39888	POWDER	24-72 HRS	**15 g**	+	142	2.3	5 DAYS	-	139	3.8
85	67	M	60122	PASTE	24-72 HRS	**5 g**	-	115	3.8	5 DAYS	-	142	3.3
100	37	F	39976	POWDER	24-72 HRS	**5 g**	-	100	4	5 DAYS	-	145	3.9
103	62	M	60176	POWDER	24-72 HRS	**5 g**	+	140	2.2	5 DAYS	-	143	4.2
114	29	M	40032	POWDER	24-72 HRS	**5 g**	+	138	2.7	5 DAYS	-	142	4.3
131	32	F	60260	POWDER	24-72 HRS	**5 g**	+	140	2.1	5 DAYS	-	140	3.6

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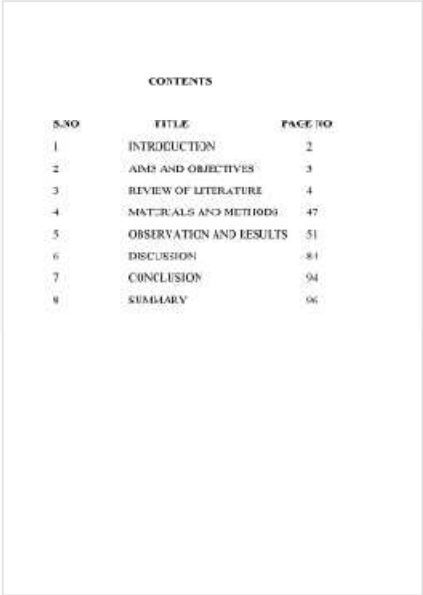

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